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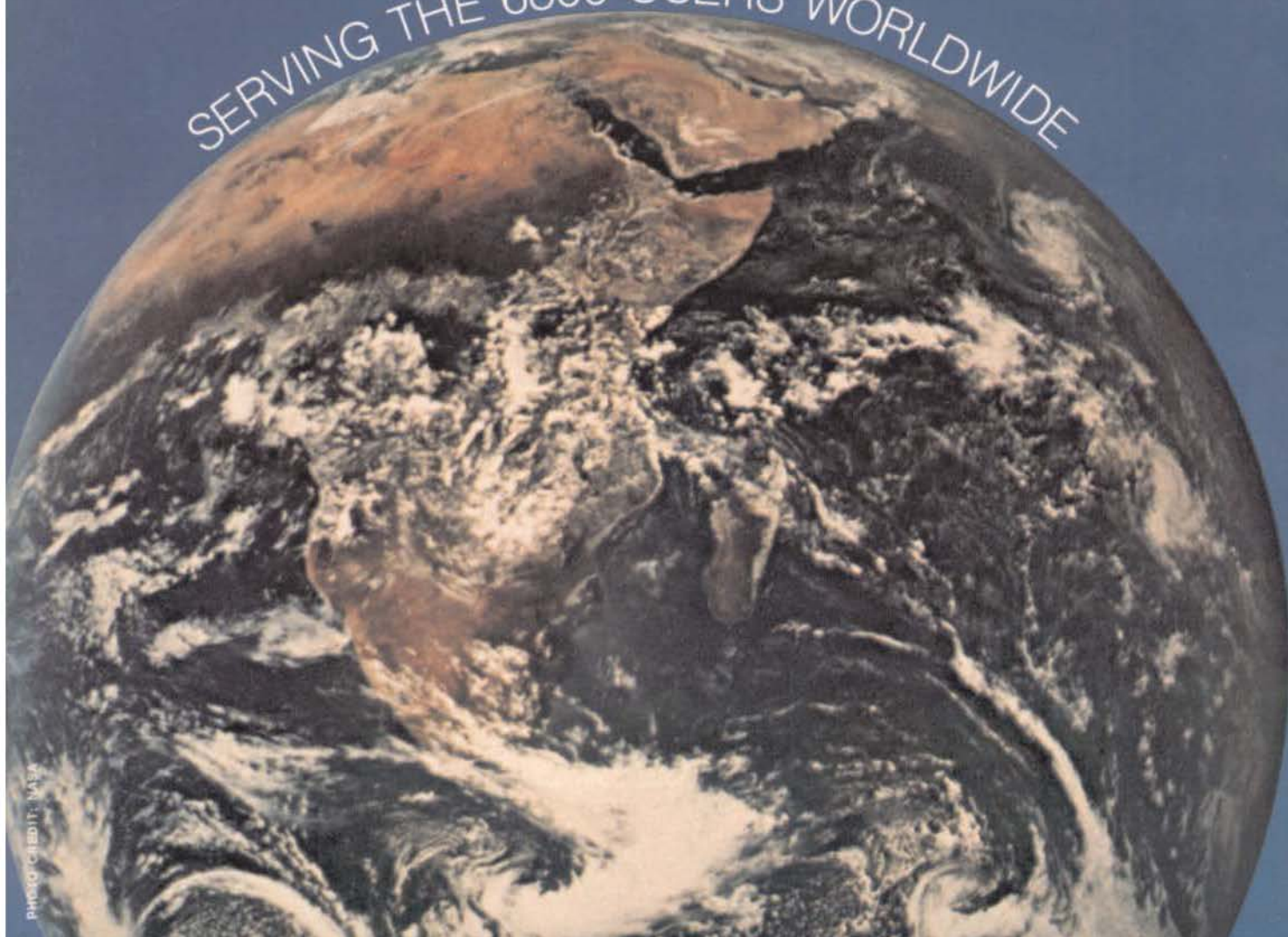


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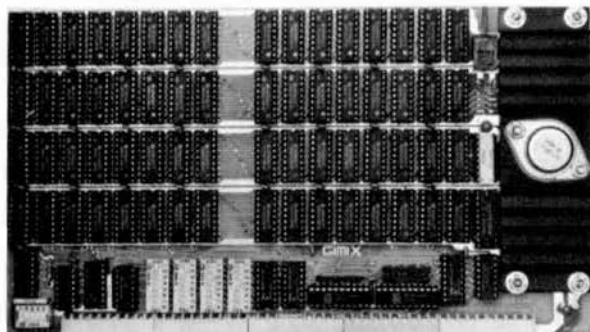


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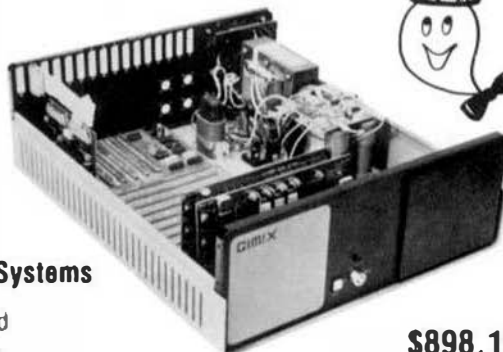
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- Under software control, the user can select the following for any drive:
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 - ☆ Single density or double density data.
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 - ☆ 40 track or 35 track density on double sided 5¼" drives.
 - ☆ User can select the system boot configuration.
- Occupies only 16 bytes of memory space (F760-F76F standard). User selectable to any 16 byte address space.
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- Contains extended decoding circuitry for extended addressing per SS-50C bus which can be enabled by an option jumper.
- SSB provides a means for copying software written by older versions of DOS68 to be read by DOS68D. All new media formatted by DOS68D can be read by all older versions of DOS68. DOS68 is SSB's 6800 disk operating system.
- Track 0 of side 0 is recorded in single density per IBM standard.
- Phase-locked-loop assures highest data integrity attainable.

All of these features are available for immediate delivery on one standard 5¼" x 9" 50 pin SS-50/SS-50C card for only \$449.00. The price includes DOS68D version 5.1, MONITOR object code on diskette, and a manual with the source listing.

SCB-69
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6809CPU Board
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The most versatile 6809 CPU Board on the market is now available from Smoke Signal Broadcasting and has the following features:

- Standard 2 MHz operation.
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- Standard real-time clock (time-of-day, day-of-week, day-of-month) with battery back up capable of generating programmable interrupts.
- Up to 20K of EPROM can be installed on the CPU Board.
- Standard 1K of RAM on board.
- Includes improved 6809 Monitor (and source listing).
- Contains an FPLA for decoding EPROM address and optional devices. Switches are used to select 2K/4K EPROM and Fast/Slow I/O.
- Contains provision for optional 9511/9512 floating point processor.
- NMI line is user selectable to work with either SS-50 or SS-50C busses.

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M-32-X 32K Memory Board is priced at \$539.00.

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SOFTWARE ANNOUNCEMENT

NEW

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English Text Analysis Program
By Dale Puckett

READTEST is a must for all writers and writing instructors. Reads prose from disk file and tells how well it was written. Reports number of lines, words, sentences, personal words, affixes, average sentence length. Individual reports pinpoint trouble areas. Overall index tells who can read it and who would print it. Fast 6800 object code. Runs in FLEX_{im}.

Without useful applications programs our microcomputers are nothing more than expensive toys. With the proper applications programs however, they can do almost anything and become indispensable.

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READTEST reads your letters, short stories, news stories, reviews, novels, etc., from the disk file you prepared them on and tells you how well they were written.

READTEST is a powerful tool designed to aid both the student writer and keep a running check on the experienced writer. It is a serious application of your 6800 microcomputer that will pay for itself with the first check you receive for a readable manuscript.

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JCP

Job Control Program
By Peter Murray

The JOB CONTROL PROGRAM (JCP) reads a text file that contains the necessary input for a program and then supplies this input to the program in the same manner that an operator would have normally entered it from the keyboard. The file containing the input is referred to as the procedure file, and the program receiving the input is referred to as the calling program. A procedure file contains input for such calling programs as FLEX_{im}, FLEX utility commands, and other development software.

JCP also provides for parameter substitution within the procedure file, special commands to control JCP program flow, and a means for recovery from processing errors. These features allow for commonly used file routines to be written as a generalized procedure that JCP will execute, unattended, simply by entering a single FLEX command.

See Review in July '80 '68' Micro.

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REMOTE

Intelligent Terminal Program
By Tom Speer

REMOTE and a modem give you access to community bulletin board systems, timesharing computer systems, other microcomputer systems, etc.

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HELP

Help for FLEX_{im}
By Frank Hogg

Forgot the command syntax? Type HELP! HELP keeps information at your fingertips. It eliminates the need to fumble through manuals and also helps beginners operate your computer.

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ESTHER

An exercise in artificial intelligence
By Dale Puckett

ESTHER is Eliza+. Artificial intelligence in pure 6800 code. Source shows how. Object amazes friends. ESTHER; remembers names, drops them, uses players name, answers third person replies, echos keywords. 75+ keywords. 48+ sets of replies. Auto line length. Runs in FLEX_{im}. Obeys TTYSET. ESTHER is both educational and fun !!!

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FRANK HOGG

DENTAL LABORATORY

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All software is currently available on FLEX_{im} 2.0.5" disks or MSX FLEX_{im} 1.0.8" hard sector disks. The package includes a users manual, the disk with object code AND FULLY COMMENTED SOURCE LISTING, a programming manual with information about the program and hints for changes, and where applicable example programs. 6809 versions (being worked on now) will utilize the 6809 architecture and be fully position independent. VISA and MC accepted. SOURCE TCF339

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*SORT/MERGE Program can be used manually or within other BASIC or assembler programs to perform high speed sorts of data files.

*Hemenway Associates Software Products for use under FLEX™ are available on the MSI System.

*TRS-80/MICROSOFT BASIC - MSI BASIC Translator allows MSI users to run the large library of basic programs written for the TRS-80 and other similar systems.

*SOFTWARE LIBRARY Programs keep track of all diskette and hard disk directories, giving alphabetical listings of available programs.

*SDOS Operating System.

*MULTI-USER/MULTI-TASKING SDOS Operating System allows any user to perform edits, assemblies, compilations, or program executions independently and simultaneously.

*All MSI software is supported on four (4) disk systems: quad density minifloppy, single and double density 8" floppy, as well hard disk systems.

*Complete BUSINESS APPLICATION PACKAGES including sales order entry, accounts receivable, inventory management, purchase order entry, accounts payable, and general ledger are available on MSI hard disk systems.

*PLOTting PACKAGE gives daisy-wheel printers the capacity to perform graphics operations.

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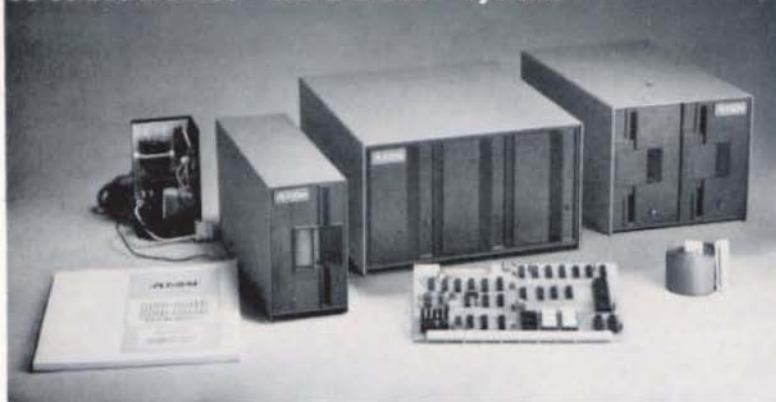
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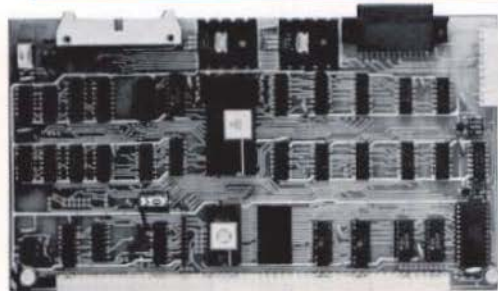
Percom mini-disk systems start as low as \$599.95, ready to plug in and run. You can't get better quality or a broader selection of disk software from any other microcomputer disk system manufacturer — at any price!

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cuit, buffered control lines and other mature design concepts • ROM DOS included with SS-50 bus version — optional DOSs for EXORciser* bus • extra PROM sockets on-board • EXORciser* bus version has 1K-byte RAM • supported by extended disk operating systems; assemblers and other program development/debugging aids; BASIC, FORTRAN, Pascal and SPL/M languages; and, business application programs.



EXORciser* Bus LFD-400EX™ -800EX™ Systems



The SBC/9™, A "10" By Any Measure.

The Percom SBC/9™ is an SS-50 bus compatible, stand-alone Single-Board Computer. Configured for the 6809 microprocessor, the SBC/9™ also accommodates a 6802 without any modification. You can have state-of-the-art capability of the '09. Or put to work the enormous selection of 6800-coded programs that run on the '02.

The SBC/9™ includes PSYMON™, an easily extended 1-Kbyte ROM OS. Other features include:

- Total compatibility with the SS-50 bus. Requires no changes to the motherboard, memory or I/O.
- Serial port includes bit-rate generator. RS-232-C compatible with optional subminiature 'D' connector installed. 10-pin Molex connector provided.
- Eight-bit, non-latched, bidirectional parallel port is multi-address extension of system bus. Spans a 30-address field; accommodates an exceptional variety of peripheral devices. Connector is optional.
- Includes 1-Kbyte of static RAM.
- Costs only \$199.95 with PSYMON™ and comprehensive users manual that includes source listing of PSYMON™.

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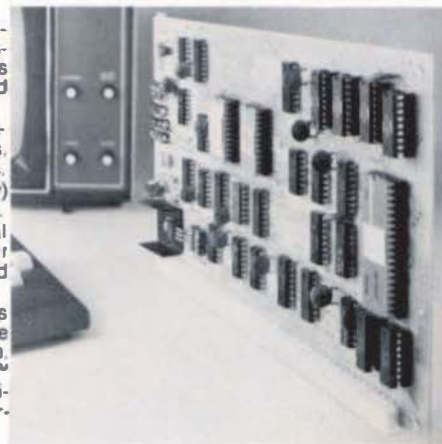
plugged into an SS-50 bus. Features wide-trace conductors. Price: \$21.95
SS-50 BUS CARD — accommodates 34- and 50-pin ribbon connectors on top edge, 10-pin Molex connector on side edge. Price: \$24.95.

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- Generates 128 characters including all ASCII displayable characters plus selected Greek letters and other special symbols.
- Well-formed, easy-to-read 7x12-dot characters. True baseline descenders.
- Character-store (display) memory included on card.
- Provision for optional character generator EPROM for user defined symbols.
- Comprehensive users manual includes source listing of Driver software. Driver — called WINDEX™ — is also available on mini-diskette through the Percom Users Group.



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NEW PROD-RUMORS-ETC

Coming soon (maybe 6 months or less) are some new disk systems and other useful hardware (and software) for the S50 bus. Also some recently arrived new products that although not completely evaluated, we feel deserve mention now. More on some of them later.

First I had hoped to give you an early peek at some of the new disk systems, mainly OS9 and UNIFLEX. We have set up two 6809 computers, one for each system. They both have dual density double sided 8" disk drives and access to the SWTPC CDS-I hard-disk system. Each is equipped with a SWTPC CT-82 terminal. However, we have neither inhouse yet and so hopefully by next month I can report some initial reaction to these new and powerful systems.

We have received this week a new 256X256 video graphics board from the Hazelwood Computer Systems (see ad this issue). This board is of excellent quality and we are preparing a review of it for a coming issue. I ran it on one of our 09 systems when it arrived and am impressed with the ease of operation. It is the most simple to use graphic board that I have tested. The quality is commercial+ and the output to a Sanyo 9" monitor is glitch and splatter free.

We would not recommend the LEMDEX Video-100 monitor for this application. We have had considerable problems with ours (after two trips back for repair) and now do not use it at all. The scan in both directions is of poor quality and ours is for sale. For quality and useable display I would recommend some other brand of video monitor!

The programs we ran in machine language were fast in execution and simple (!) to use. We were able to do queso-30 pictures right off the bat by simple modifications to the sample programs furnished with the board. Some pictures next month if our film turns out ok. Also the BASIC (TSC) programs furnished, 'Sinewave and Limacon', although not as fast in execution as machine code, open up some interesting applications.

Also we received a couple of excellent word processing packages. From Micropl (see ad this issue) came their new 'BLITZ' editor. A simple to use and adequate editor for many applications. BLITZ is a true 'window' editor and handles files of unlimited size. All corrections to characters are made at cursor position and the results are immediate. BLITZ uses the features of the SWTPC CT-82 terminal to accomplish cursor control, as well as scrolling back and fourth thru the file. While BLITZ does not support 'global' operations, it can be easily learned and makes an excellent editor for simple text editing.

From SONEX SYSTEMS comes the 'STYLUS' word editor and output formatter. This is the first package that we have used that is completely a self contained, one program, editor and formatter with printer drives.

STYLUS is a full feature text editing system. The text displayed is always shown as the final justified output as will appear in the printed form. Global block copies and moves are available. Global searches and 'finds' are also available to the user. Hyphens are possible for none proportional output drivers. Page locations are automatic and the operator always knows where the text is located in respect to the remainder of the file. Insertion and deletions are immediately reflected on the CRT screen and text is automatically expanded or constricted as editing progresses.

A bundle/unbundle commands allows immediate view of the results of any operation; that is, it allows formatting commands to appear or disappear at operator command. Underlining, subscripting and boldface operations are possible. Tabs both vertical and horizontal as well as center, left or right justification are operator controlled. With the proportional drivers incremental spacing commands are callable.

STYLUS is FLEX[™] compatible and programs prepared by STYLUS can be used by the TSC BASIC's and assembler. Boiler-plate type documents are a snap with this software. Printer output can either be direct or to a spooling file for later call.

STYLUS requires about 18K of memory and versions for both serial and memory mapped terminals are available from Sonex Systems.

They report that updates will be available to registered users for a modest fee. Current versions are available for QUME, Diablo, NEC or regular TTY type printer devices. Full cursor and scrolling features are supported.

The version received uses a TTY driver and does not do proportional spacing, however, we are due the proportional drives for the QUME Sprint 3 and 5 daisy wheel printers and will give a more detailed report, when received.

For additional information contact:
SONEX SYSTEMS, Box 238, Williamsville, NY 14221,
716-634-2466.

Also received from Micropl is their new record management system RMS. RMS is an extensive data base management system. It can be used for accounting, business record keeping, management information systems, customer or personal records, inventory, customized date entry, online data retrieval and update and printed reports. RMS can be customized with very little effort or programming knowledge. RMS files can be accessed and used by BASIC or other languages.

RMS allows user determination of data storage format, values and size of data files and records and if necessary, limits or restrictions to the possible values.

RMS supports a DICTIONARY of data files and types. Once these are created by the user the following are automatically available. Creation of a disk file formatted to store the data. Online data entry in a 'form fill-out' to the CRT. Online data access for lookup or modification. Creation of printed reports to the users specifications. Formats may be later changed as conditions require.

RMS consist of the following utilities and programs. RMSNEW - formatter for data to the users needs. RMS EDITOR - used to input, modify or display data in a file. REPORT - creates printed reports from RMS data files, facilities are included to allow users control of the final printed form. INDEX - a program to allow creation of one or more index files which in turn can drive the RMS EDITOR or REPORT programs in user required order for display, modification and printing. RMSCOPY - copies a file when it needs modification, also it can merge or post one file to another.

RMS is convenient and easy to use. No extensive programming experience is required and the operation allows functions found on larger and more expensive computers.

RMS as furnished runs on 6809 machines using the

CT-82 SWTPC terminal and other X Y addressed terminals. FLEX™ for the 6809 is required as the disk system.

An infusion of new disk systems seem to be in the offering. SWTPC has the prototype running of a new 5" double sided, double density, double track disk system for 6809 systems. Capacity will be on the order of 2800 sectors per disk at 256 bytes per sector. The price will be somewhat higher than the present MF-69 system, but byte for byte it should be an excellent buy. More on this after we get one.

From GIMIX comes word that they are now beginning to ship their new 6809 CPU card (see page 48). I understand that the backlog of orders is fierce so if interested better get that order in. And NO, as of this writing we have not received ours so cannot tell you much more until we get one up and running. Also from GIMIX soon should be four disk controller boards. The larger (50 pin slot) is a DMA type controller that will handle 4 5" drives and 4 8" drives as well as a hard disk. In addition will be three 30 pin resident disk controller boards. Two will handle 5 or 8 inch drives, one will handle 5 inch only. One complete and tested will be on the order of \$200.00 and the other less the 1771 will be somewhat less (in an burned-in but untested state). Look for GIMIX ads to give more details.

From Sirius of Knoxville, Tennessee is rumored a new 8 inch double drive disk system. The complete package with 2 8" double sided double density disk drives, power supplies and enclosure with controller board and cable will be on the order of \$1,600.00 or so they told us at the recent Atlanta show. They claim that it will run on any S50 bus system in a standard configuration. Watch for coming Sirius ads concerning this disk system and their complete Forth program for the 6809.

A new S50 publication is now being offered by SS-50 Newsletter, PO Box 402, Logan, Utah 84321. The format is typeset 25 to 30 pages 6 3/4 by 10 inches. It is scheduled to be published every other month. I thought you might like to know.

OUR ADVERTISERS

Since the first we have attempted to 'shoot straight' with you the readers. There are some advertisers that we have not allowed, that are advertising in other magazines. Despite the fact that we could use the revenue, I felt that it would not be honest on our part to accept advertising from companies who do not live up to normal business ethics. Especially if we accept their money to tell you about products and services that DO NOT perform as advertised. I know that from time to time some of our advertisers receive complaints. Many of them are justified, many are not. When informed we follow up on all complaints received from you the readers. Last year we spent more than \$1,000.00 on telephone calls to responsible persons, at various advertisers, running down complaints and trying to get solutions and answers. For the vast majority of them we succeeded. In a few isolated cases we could not accomplish any satisfactory results. Some of these were due to errors on the advertisers part and some due to a lack of technical understanding on the part of the user. Most were problems of communication. Some concerned complaints that the equipment did not work after making some non-factory modification. Most all equipment makers will not and can not (for technical reasons) support their equipment or even attempt to repair it if it has had major or even minor modifications made. Assuming of course, that the modifications were not factory approved modifications. It should be understood

that if you want a non-standard configuration in your system, it may work, but from there on you are on your own.

Some of the problems were because of parts shipment delays and other non-controllable factors. Certainly it is easy to say that they should have planned ahead. Maybe they should have, but even the biggies got caught in the most recent parts shortage. We know of not one of 'OUR' advertisers who did not come through, as parts and personnel were able. Some were slow, far too slow, but no one who has ordered from one of our advertisers paid out good money and received nothing in return, at least not to my knowledge and I personally see and follow up on each case that is brought to our attention.

We have had a few instances of users who have returned supposedly faulty equipment or other purchased objects for repair or update. We receive calls daily from readers who state that they have just received such and such, and it does not work, or has serious problems. In many cases (where we allow it to be advertised) we have found that the problem was not wholly with the product but also with some part of the system, many times non-factory approved modifications. Yet in a few instances the user was never satisfied and to the best of my personal knowledge the vendor refunded upon return of the product. To the best of my knowledge every product or service advertised in 68 Micro Journal is as advertised.

I feel a deep sense of responsibility in what our advertisers say to you OUR reader. In EVERY case we either test a product or consult with some one who is knowledgeable and has used the product, before we accept their advertising. In a few instances we have required that an advertiser drop out his advertising until he gets things a bit smoother. For older vendors who have been around for most of the micro era we accept written reports from other users, from new companies we normally require a look-see. Sometimes they do not pass muster the first time around, but most have come back with workable and worthwhile products.

We are not POLICE, we have a difficult time in trying to make everybody happy. Sometimes we don't, but we honestly try.

Our advertising policy is simple; the product or service MUST PERFORM AS ADVERTISED! If it is a poor or lousy product and the advertiser advertises it as such, I would allow it. So far none have accepted that offer.

Our lab attempts to rate products fairly. Most of the ratings have been AAA, the best we give (which does not imply that it is the best made). The reason that so many have good rating is very simple. The bad ones do not get published. We hope that the rejected advertiser will go back and get the act straight. This way we all gain, we the user get a better product and the vendor gets another chance. The ones that do not shape up are not published, as long as they do not attempt to sell it to our readers, thru any media. We would rather use our limited space to tell you about good products, rather than ones you can or would not want to use.

We now believe that we are reaching a majority of 6800 and 6809 users. Also a large national rating service indicates this also. Which brings us to another point. When you purchase a product or contact an advertiser, let them know that you read 68 Micro Journal. The ADVERTISERS make it all possible. Due to the relatively small number of us as compared to some other bus or make, our per unit cost to produce 68 Micro Journal is more than we now

receive for subscriptions and even less for the thousands that are going out on newsstands each month. The difference is paid for by the advertisers. Without them you would still have nothing in the way of articles for the 68XX series of computers or the fifty bus. Just look back over the past three years. We know for a positive fact that some of the others only run 6800 articles (many of them old and outdated),

because many of you have switched over to 68 Micro Journal only.

This brings up a hard and real economical fact of life. The 68XX community would be hard pressed at this point in supporting two 68XX magazines. In fact if there were two 68 Micro Journals, splitting evenly the advertising that is available, neither one would survive. We simply do not have the numbers.

I feel that we are printing and distributing 68 Micro Journal as economically as possible. We do all our own work except mailing. Not even BYTE, KB or the others do that, in so far as we know. Always the best way dollar wise is inhouse production, we do.

So here is the point PLEASE let those advertisers who have supported 68 Micro Journal (and you) know that you appreciate it. We know that some of them are still advertising in other magazines. For the most part they reach markets (other magazines) we do not cover. That is the way that it should be for they are reaching readers who do not read 68 Micro Journal, and we want them to expand and prosper. For as they do, so do all of us. So let our advertisers know if you appreciate having your own magazine, not cluttered with articles and other matter not faintly related to the 68XX series of devices or the \$50 bus. Things are going good now, lets keep it that way and hope it can even get bigger and better. You, our readers will make the decision. Please let me know your feelings on these matters. Think back!

DMW

READTEST

An English Text Analysis Program

This month we review READTEST, a 6800 assembly language program offered by the Frank Hogg Dental Laboratory, 130 Midtown Plaza, 700 East Water Street, Syracuse, New York, 13210.

READTEST is just over 6K long and will run fine in an 8K machine. However, at least 12K is preferred. It sells for \$39.95.

We decided to look at an applications program this month because we sincerely believe that without useful applications programs our microcomputers are nothing more than expensive toys. With the proper applications programs however, they can do almost anything imaginable and become indispensable.

BACKGROUND

READTEST is based on readability research performed by Dr. Rudolf Flesch. Flesch is the author of "The Art of Clear Thinking," "The Art of Readable Writing," and "The Art of Plain Talk." The program READTEST is based on the theories presented in the latter. The book is definitely required

reading for persons interested in improving their verbal communications skills.

The original statistical readability formula was published in Dr. Flesch's Ph.D. dissertation. The paper was very successful and many businesses and government agencies began to use Flesch's formula.

However the paper itself, being a dissertation, was not the most readable book in the world. This embarrassed Flesch, and he rewrote the dissertation. The result was "The Art of Plain Talk."

It should be noted here that even Flesch realized that his formula was not a magic formula for good writing. It is merely a yardstick with which you can gauge your progress. You will find however, even if you are already an experienced writer, that READTEST will help keep you honest when you start rambling.

WHAT IS READTEST?

The goal of the program READTEST is to help you write so that people find it easy to understand what you mean.

Almost every book that promises to teach you how to write will tell you to use simple and ordinary words. The same books will tell you to keep your sentences short. Most of them however, fail to define simple, ordinary and short, etc., and often don't follow their own advice.

READTEST implements Flesch's theory that the closer a word is to its root, the easier it is to understand. It checks the number of common prefixes and suffixes used in your sentences and grades you accordingly. It also gives you credit for using a lot of familiar personal words that have high appeal.

But, just what is READTEST? What will it do for you?

READTEST is a must for all writers. It is a tremendous tool for students and writing instructors. And, it helps experienced writers keep a running check on the readability of their prose.

READTEST reads plain English text from a standard FLEX disk file. It then reports the number of lines, words, sentences, personal words, affixes, and average sentence length. This information helps pinpoint trouble areas that make your prose harder to read and understand.

After providing these individual reports, READTEST computes an overall index and tells what it means. You learn the grade level of the person most likely to read and understand your copy. Then, you receive a report which indicates the type of publication that would be most likely to buy your story. This will help you hit your target market, assuming of course that you are also on target with your subject matter.

FEATURES

Here are some of READTEST's major features.

READTEST tells you how many words you have written.

READTEST tells you how many sentences you have used in your prose. The number of words and sentences is used to compute the average sentence

length. This is one of the key factors in readability. The shorter the sentence, the easier it is to understand.

READTEST checks to see how many times you have used key personal words. People relate to these words and they make your prose much easier to digest. The more of these words you use, the higher your score and the lower the grade level of those who can understand it.

READTEST counts the number of names (proper nouns) used in your writing. This number is added to the number of key personal words to determine the total number of personal references. The more you use, the higher your human interest score.

READTEST counts the number of affixes used in your writing. The less you use, the higher your score.

The meaning of a root word is almost always obvious. However, when you stick a prefix in front of it, a suffix on the end of it, and sometimes another affix somewhere in the middle, you tend to confuse and slow down the reader.

Affixes are bad. READTEST tells you if you used too many.

READTEST looks forward when counting prefixes and backwards when counting suffixes. If a match fails, READTEST immediately moves to the next word. This results in a time saving of approximately 20 per cent.

READTEST rates your text as: very difficult, difficult, fairly difficult, average, fairly easy, easy or very easy to read.

READTEST also classifies your prose as: dramatic, highly interesting, interesting, mildly interesting, or dull.

READTEST contains nearly 200 common affixes and 75 common personal words in its tables.

READTEST is written in assembly language which gives it the speed necessary to evaluate every word in a large text file. It would take more than a half hour to do the same evaluation of a 1,500 word story with a BASIC readability program.

And, READTEST's comprehensive reports make it easy to pinpoint readability problems in your writing. READTEST is completely impartial and will uncover bad habits and trends in the prose of pros as well as that of the beginner.

DEFINITIONS

In order to make the operation of READTEST easier to understand we must first define the items it counts.

The number of WORDS is determined by counting the number of spaces in the text file being evaluated.

The number of SENTENCES is found by counting the occurrence of periods, colons, exclamation points and question marks. Some readability researchers also count the semi-colon as a sentence since it often denotes the end of a thought. READTEST does not implement that feature however.

The number of NAMES (proper nouns) is determined by searching for words that begin with a capital letter. For example, Kansas would be counted as a proper noun.

Two exceptions have been built into READTEST's algorithm. The first word in a sentence is not counted as a proper noun since it is always capitalized in standard English text. Also a pair of words that starts with a capital letter, ie, President Carter or Kansas University, is counted as one proper noun.

The number of personal words and affixes is determined by loading the entire text file into memory and searching it against two tables. Every time a match is found, the appropriate counter is incremented.

The AVERAGE SENTENCE LENGTH is computed by dividing the number of words by the number of sentences. Also computed, but not printed in numerical form in the report is the percentage of personal words and affixes.

HARDWARE REQUIREMENTS

READTEST loads into memory from \$0020 to \$17CD. All available memory between \$17CD and the address stored in FLEX's MEMEND is used for a buffer to locate and find personal words and affixes.

READTEST does not require a large amount of memory to read and analyze long text files however, because it is written to work in segments if an entire file will not fit in memory.

READTEST expects the input from the file to contain both upper and lowercase letters. This allows it to identify and count proper nouns because they are capitalized. This count eventually leads to a computation which determines how interesting the text is to the average reader.

FLEX COMPATIBILITY

READTEST.COMD is a standard FLEX™ command file and can be executed by typing READTEST FILENAME.

READTEST defaults to a .TXT extension on the work drive. Other extensions and drive numbers may be used however, if they are explicitly defined in the command line. Example: READTEST 2.GOODWORDS.BAK.

All of READTEST's input and output is made through calls to FLEX's GETCHR (\$AD15), PUTCHR (\$AD18), PSTRNG (\$AD1E) or PCRLF (\$AD24) routines. Therefore, if you are using the FLEX operating system you should not have any problems.

READTEST will read any standard FLEX .TXT file. And, you don't have to worry about the text processor command lines interfering with your count. READTEST looks for these commands and ignores them.

A WORD ABOUT SPEED

Readability testing was once a very tedious process. Companies hired paraprofessionals to manually count words, sentences, and proper nouns, etc., in several 100 word samples from every chapter of long textbooks. They slowly went crazy.

This program reads every word in your file and calculates an overall performance rating, not an average. However, you must be patient when you first run READTEST. It takes approximately three minutes to analyze the copy from a typical 2,500 word magazine article.

If you think that's slow, I challenge you to pull out a book and count everything READTEST counts

In a 100 words sample. You'll find it takes at least five minutes. After timing your own counting, let READTEST work on a small 100 word file. In about a second, you'll have a report.

HOW TO GET THE MOST OUT OF THE PROGRAM

After reading a readability report from READTEST, seriously try to improve your score. You'll find that your writing will be much easier to read after a few tries. You may never become a Hemingway, but, the effectiveness of your written communications should increase a hundred fold.

SUMMARY

READTEST is a serious application of the 6800 microcomputer. It comes on a disk with the object code, an extremely well documented source file and a help file which gives enough information to let you run it before reading the instruction manual. A sample data file is also included on the disk to allow the user to check the operation of READTEST immediately.

A 15-page users manual is supplied with the package. It is extremely detailed and covers subjects ranging from an explanation of readability testing to the design of the program. Key routines in READTEST are also explained in detail in the manual.

Anyone that wants to improve his writing ability should give READTEST a try. As the user's manual says in the last two paragraphs, "Writing for any practical purpose is difficult and elusive. READTEST is one more tool which can help you communicate effectively."

READABILITY REPORT FOR TESTER:

Number of lines = 14
Number of words = 245
Number of sentences = 3
Number of proper nouns = 15

Number of personal words = 3
Number of affixes = 143
Average sentence length = 81
Based on the average sentence length your rating is: VERY DIFFICULT
Based on the number of affixes your rating is: VERY DIFFICULT
Based on the number of personal words, your rating is: INTERESTING; similar to material found in the digests.
Your overall readability index is: 1042
This means your story is . . .
VERY DIFFICULT READING. Your potential audience would include only four and a half percent of the population. The story would probably only be read by college graduates and would be published in a scientific journal.
Hopefully, you are pleased with your rating. If not, why not rewrite the story in an effort to communicate more effectively. Think short words, short sentences, and short paragraphs. Do not be discouraged. Writing for any practical purpose is a difficult and elusive art. Remember, Ernest Hemingway often spent eight hours writing four or five hundred words.

In the final determination of the benefits to be provided to the United States of America by the government of the United Kingdom in return for aid furnished under the act of Congress of March 11, 1941, the terms and conditions thereof shall be such as not to burden commerce between the two countries

but to promote mutually advantageous economic relations between them and the betterment of worldwide economic relations. To that end, they shall include provision for agreed action by the United States of America the United Kingdom, open to participation by all the countries of like mind, directed to the expansion by appropriate international and domestic measures of production, employment, and the exchange and consumption of goods, which are the material foundations of the liberty and welfare of all peoples; to the elimination of all forms of discriminatory treatment in international commerce, and to the reduction of tariffs and other trade barriers and in general to the attainment of all the economic objectives set forth in the joint declaration made on August 12, 1941, by the President of the United States of America and the Prime Minister of the United Kingdom. At an early convenient date, conversations shall be begun between the two governments with a view to determining in the light of governing economic conditions the best means of attaining the above stated objectives by their own agreed action and of seeking the agreed action of other like minded governments.

Having just edited the article on READTEST, curiosity got the best of me so I ran READTEST on my ramblings under NEW PRODUCTS and RUMORS, this issue. The file on disk is RUMORAUG.TXT. Unedited here is my rating. Paperback fiction; huh!!!

READABILITY REPORT FOR RUMORAUG:

Number of lines = 333
Number of words = 2713
Number of sentences = 173
Number of proper nouns = 85

Number of personal words = 50
Number of affixes = 832
Average sentence length = 15
Based on the average sentence length your rating is: FAIRLY EASY
Based on the number of affixes your rating is: VERY EASY
Based on the number of personal words, your rating is: MILDLY INTERESTING; similar to material found in trade journals.
Your overall readability index is: 139
This means your story is . . .
EASY READING. A fifth grader can understand it. Eighty-six percent of the population can handle it. It is similar to material found in paperback fiction.
Hopefully, you are pleased with your rating. If not, why not rewrite the story in an effort to communicate more effectively. Think short words, short sentences, and short paragraphs. Do not be discouraged. Writing for any practical purpose is a difficult and elusive art. Remember, Ernest Hemingway often spent eight hours writing four or five hundred words.
Aw to heck with it, I am going to run it just the way it is, paperback or no paperback, BOY!!!!

DMW

PLEASE NOTE: Effective the 15th of September 1980, due to sharp cost increases, the subscription prices of 68 Micro Journal will increase as follows. The new rates will be; one year subscription \$18.50 - two year subscription \$32.50 - three year subscription \$48.50.

We have held off hoping things would level out but they just keep going up, so we must pass along these increases. If prices ever start down, so will our rates. All subscriptions and renewals received after the above date should be for the above amounts.

FLEX USER NOTES

Ronald W. Anderson
3540 Sturbridge Court
Ann Arbor, MI 48105

Continued from last month (July '80) with additional listing omitted from a previous column of FLEX USER NOTES, by Ron Anderson.

OTHER NEWS

I've been working on a floating point math package for use in my work, though the effort has been on my own time. I've gotten it working quite well, and when the 6809 board arrived, it seemed reasonable to try to convert as a test to see if the new instruction set would make for more efficient programming. So far, I've managed to reduce the original 1500 byte program by over 250 bytes, and I'm still working at it. The savings were mainly due to the fact that the math package uses a stack and reverse Polish notation. Such handling of math is very efficient in terms of instructions needed to do an operation but a great deal of INDEX and STACK POINTER manipulation is necessary. In the '09, all the pointer swapping went away. The biggest savings were realized by the fact that the stack pointer may also be used as an index pointer. That means that you can push a floating point variable on the stack and work on the successive bytes of it, addressing by means of 0,S; 1,S; etc. I've not even tried to do the multiply by taking advantage of the 8 by 8 bit multiply of the '09. This can be used to do a 16 by 16 bit multiply by doing four multiplies and two adds, and it may be extended to further precision as well.

By the time I'm done, the package will probably be just over (unfortunately for EPROM use) 1 K. The reverse Polish notation lends itself to a simple "compiler" that can read an equation expressed in notation identical to that of most BASIC interpreters, and generate a list of instructions for the math package. I've written such a "compiler" in BASIC and again in A/BASIC for my math package, and it works quite well, allowing equations in the program to be translated to a source listing for the assembler by the "Math Compiler". If there is enough interest in this, we will pursue the subject over a period of several months in this column,

resulting in the publication of a working floating point package with a compiler to generate math instructions, and the necessary I/O routines to convert between ASCII and floating point binary representations. A Binary math is desirable for speed and simplicity, but the conversion routines take about as much code as the math routines. Perhaps we can all learn a great deal about such packages by looking at conversion routines and output formatting. Figure 1 is a listing of a source and a compiled and assembled section of code for the math package. You will note that the equation remains as a comment, and that I have flagged the compiler with a *MATH * statement that is deleted by the compiler. If you are interested in pursuing this further, please drop me a card or letter. If the response shows more than a few interested readers, we will set into the detail of this over several issues of '68' Micro Journal.

For my original subscribers, I had published a set of programs for modem operation using a "C" interface on port 0. These have been reworked to use with a serial interface on that port. The programs include TERMEM which makes your system look like a terminal to a CBBS or another system, and keeps all the information transitted in memory with provision to save it to a disk at the end of the communication. TERMEM also allows you to echo or not. When two users talk via modem, one may echo and the other not, and full duplex operation is maintained. The two programs M.CMD, and MODEM.SYS work just like P.CMD and PRINT.SYS to allow you to use any of the FLEX utilities such as LIST, PR, CAT, DIR, ASM, etc, and switch the output to the modem. In all the programs all output to the modem is also output to the terminal. You must be running your terminal at at least 2400 baud and preferably 9600 to use these programs. The serial port version is presented here. If you want a copy of the "C" interface version, send me \$1.00 to cover reproduction cost and postage, and I'll send you a listing. This is an ideal way to turn a "useless" old "C" interface into something useful. You will need to cut one foil and make one connection on the circuit board to remove the "hardware" echo of the "C" interface.

Well, that's about all for this time. I would be grateful for some responses from readers as to the material presented and desires for future columns, though I'm certain we can't please everyone.

```

6      LOGO.CMD
7
8      THIS UTILITY ALLOWS LOADING A FILE TO AN OFFSET MEMORY
9      LOCATION FOR USE WITH POSITION INDEPENDENT CODE
10     TO LOAD A UTILITY IN A PLACE OTHER THAN IN THE
11     UTILITY (C100) AREA IF IT CONFLICTS WITH A PROGRAM
12     TO BE OPERATED ON BY IT. SUCH POSITION INDEPENDENT
13     PROGRAMS SHOULD BE ASSEMBLED WITH ONE SO THAT THE
14     OFFSET SPECIFIED IS THE LOAD ADDRESS AND SHOULD HAVE THE
15     EXTENSION .PIC. ONLY FILES WITH THIS EXTENSION WILL
16     LOAD AND GO BY USING THIS UTILITY.
17
18     BY CONVENTION, ALL SUCH POSITION INDEPENDENT PROGRAMS SHOULD
19     HAVE THE FIRST LOAD ADDRESS AS ENTRY POINT. IT MAY BE DIRECT
20     OR BE A BRANCH OR JUMP TO ANOTHER START LOCATION.
21
22
23     BY RON ANDERSON
24     3540 STURRIDGE CT.
25     ANN ARBOR MI 48105
26     313 995-1636
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12 * FOR EXAMPLE M01 WILL JUMP 0100-01FF
 13 * AFTER A PAGE IS JUMPED, ENTER F TO CONTINUE
 14 * FORWARD, B TO BACK UP A PAGE, NXX TO GO TO PAGE XX
 15 * OR E TO EXIT TO DOS.
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```

PROGRAM SCIPKG;

```
(* SCIENTIFIC FUNCTIONS *****
  IF YOU USE THIS PACKAGE IN A PROGRAM, THE FOLLOWING CONSTANT
  AND VARIABLE DECLARATIONS MUST BE MADE AT THE START OF YOUR
  PROGRAM SO THEY ARE GLOBAL FOR ALL OF THE FUNCTIONS AND
  PROCEDURES HERE, *)
```

```
CONST
  PI=3.141592654
  ERROR=1.E-01

VAR
  ANGLE : REAL;
  NUMBER : REAL;
  X:1-NUMETA : REAL;
```

```
(* INFINITE SERIES SUM CALCULATIONS FOR SINE *****
```

```
FUNCTION SINE(X : REAL) : REAL;
```

```
VAR
  TERM,SUM,X2 : REAL;
  N : INTEGER;
BEGIN
  SUM:=X; TERM:=X; X2:= -SQR(X); N:=2;
  REPEAT
    TERM:= TERM * X2 / (N * (N+1));
    N:= N+2;
    SUM:= SUM + TERM;
  UNTIL ABS (TERM) < ERROR;
  SINE:= SUM;
END;
```

```
(* SINE FUNCTION *****
```

```
FUNCTION SIN (X:REAL) : REAL;
```

```
VAR
  MINUS : BOOLEAN;
```

```
BEGIN
```

```
(* MAKE X POSITIVE IF NEGATIVE *)
```

```
WHILE X < 0 DO
  BEGIN
    X:= X + 2 * PI;
  END;
```

```
(* REDUCE POSITIVE X TO 2 PI OR LESS *)
```

```
WHILE X > 2*PI DO
  BEGIN
    X:= X - 2 * PI;
  END;
```

```
(* NOW REDUCE TO PI OR LESS AND SET SIGN FLAG *)
```

```
IF X > PI THEN
  BEGIN
    X:= X - PI;
    MINUS:=TRUE;
  END
ELSE MINUS:=FALSE;
IF MINUS THEN
  SIN:= -SINE(X);
ELSE
  SIN:= SINE(X);
END;
```

```
(* FOR COSINE: ADJUST X BY PI/2 AND USE SINE *****
```

```
FUNCTION COS (X:REAL) : REAL;
```

```
BEGIN
  X:= X+PI/2;
  COS:= SIN(X);
END;
```

```
(* TANGENT EQUALS SIN/COS *****
```

```
FUNCTION TAN (X: REAL) : REAL;
```

```
BEGIN;
```

```
SIN:=SIN(X)/COS(X);
END;
```

```
(* ARCTANGENT USING SERIES *****
```

```
FUNCTION ATN(X : REAL) : REAL;
```

```
CONST
  A5=-0.052049;
  A4=0.27623;
  A3=-0.45613;
  A2=0.925174;
  A1=0.99817;
  A0=0.67726-5;
```

```
VAR
  RECIPROCAL : BOOLEAN;
  RESULT : REAL;
```

```
BEGIN
```

```
IF X > 0 THEN
```

```
  BEGIN
    X:= 1/X;
    RECIPROCAL:=TRUE;
  END
ELSE RECIPROCAL:=FALSE;
```

```
IF X < 0 THEN
  RESULT:=A0+X*(A1+X*(A2+X*(A3+X*(A4+X*A5)))));
ELSE RESULT:=0;
```

```
IF RECIPROCAL THEN
  ATN:= PI/2-RESULT
ELSE ATN:=RESULT;
```

```
END;
```

```
(* SQUARE ROOT USING NEWTON'S METHOD *****
```

```
FUNCTION SQR (N : REAL) : REAL;
```

```
LABEL 101
```

```
VAR
```

```
  OLD,NEW : REAL;
```

```
BEGIN
```

```
  OLD:= 3; NEW:= 0;
```

```
  IF N=0 THEN GOTO 101 (* TRAP SQR ZERO TO AVOID DIVIDE BY ZERO IN TEST *)
  NEW:=3; (* GET UP FOR LOOP *)
```

```
  REPEAT
```

```
    OLD:= NEW;
    NEW:=(N/OLD+OLD)/2;
  UNTIL ABS(NEW - OLD) / NEW < ERROR;
```

```
  (* SQR:= NEW;
```

```
END;
```

```
(* EXPONENTIAL FUNCTION SIX *****
```

```
FUNCTION EXP (X : REAL) : REAL;
```

```
VAR
```

```
  TERM,SUM : REAL;
```

```
  N : INTEGER;
```

```
BEGIN
```

```
  N:=1; TERM:=1; SUM:=1.0;
```

```
  REPEAT
    TERM:= TERM * X/N;
    SUM:= SUM + TERM;
    N:= N + 1;
  UNTIL ABS (TERM/SUM) < ERROR;
  EXP:= SUM;
END;
```

```
(* LOG TO THE BASE E OPTIMIZED BY NARROWING RANGE TO THAT
  OF FAST CONVERGENCE OF THE SERIES EXPANSION *****
```

```
FUNCTION LOG(X : REAL) : REAL;
```

```
LABEL 201
```

```
CONST
```

```
  LOG10=2.30258509;
```

```
VAR
```

```
  N : INTEGER;
  SUM,N*TERM : REAL;
```

```
BEGIN (* ADJUST NUMBER TO BETWEEN -15 AND 1.5 *)
```

```
  N:=0;
  WHILE X>1.5 DO (* ADJUST LARGE NUMBERS *)
    BEGIN
      X:= X/10;
      N:= N+1;
    END;
```

```
  WHILE X<0.15 DO (* ADJUST SMALL NUMBERS *)
```

```
    BEGIN
      X:= X * 10;
      N:= N-1;
    END;
```

```
  IF X < 0.475 THEN
```

```
    BEGIN
      X:=X*3.16227766 (* SQUARE ROOT OF 10 *)
      N:=N+0.5;
    END;
```

```
  SUM:=0; TERM:= X-1; N:=1;
```

```
  IF TERM=0 THEN GOTO 201 (* TRAP ZERO *)
```

```
  REPEAT
    SUM:= SUM + TERM/N;
    TERM:=TERM*(X-1);
    N:=N+1;
  UNTIL ABS (TERM / (N-1) * SUM) < ERROR;
```

```
  (* LOG:= SUM + N * LOG10
```

```
END;
```

```
(* RECTANGULAR TO POLAR CONVERSION *****
```

```
PROCEDURE POLAR (X,Y : REAL);
```

```
BEGIN
```

```
  R:=SQR(SQR(X)+SQR(Y));
```

```
  THETA:=ATN(ABS(Y/X));
```

```
  IF (X<0) AND (Y>0) THEN
    THETA:= PI - THETA;
```

```
  IF (X<0) AND (Y<0) THEN
    THETA:= PI + THETA;
```

```
  IF (X>0) AND (Y<0) THEN
    THETA:= 2*PI - THETA;
```

```
END;
```

```
(* POLAR TO RECTANGULAR (CARTESIAN) CONVERSION *****
```

```
PROCEDURE CART (R,THETA : REAL);
```

```
BEGIN
```

```
  X:= R * COS(THETA);
```

```
  Y:= R * SIN(THETA);
```

```
END;
```

```
(* DEGREE TO RADIAN CONVERSION FUNCTION *****
```

```
FUNCTION DEGREE(X : REAL) : REAL;
```



```

22
23 0000      BEGHEM EDU 0000
24 7FFF      ENHGEN EDU 7FFF      ALTER THIS TO REFLECT YOUR SYSTEM MEMORY END.
25
26 0000      PORT0 EDU 0000
27 0004      PORT1 EDU 0004
28
29 A840      FCB EDU 0A840      FLEX2 EQUATES
30 A00C      PORECH EDU 0A00C      SWTBUG EQUATE
31 AD03      WARRS EDU 0AD03
32 AD15      GETCHR EDU 0AD15
33 AD1E      PSTRMG EDU 0AD1E
34 AD24      PCKLF EDU 0AD24
35 AD2D      CTFIL EDU 0AD2D
36 AD33      GETECT EDU 0AD33
37 AD3F      RPTERR EDU 0AD3F
38
39 B403      FMSCLS EDU 0B403
40 B406      FMS EDU 0B406
41
42 A100      ORG 0A100      FILE1 UTILITY SPACE
43
44 A100 20 05  TERM  BRA  TERM2
45 A102 01      VN      FCB 1
46 A103      BEGADR RND 2
47 A105      EN ADR  RND 2

49 A107 CE A8 40  TERM2  LDX 0FCB
50 A10A B0 A0 2D      JSR GETFIL      GET FILE SPEC FROM EQHMANO LINE
51 A10B 24 07      BCC TERM3      IF NO ERROR
52 A10F B4 15      LDA A 421
53 A111 A7 01      STA A 1X
54 A113 7E A1 F9      JMP ERROR
55
56 A116 CE A8 40  TERM3  LDX 0FCB

```

```

120 A140 A7 01      STA A 1X      OUTPUT IT
129 A142 39      RTS
130
131 A143 FE A1 05  MEMOBY  LDX ENADR
132 A146 B1 08      CMP A 018      BACKSPACE?
133 A148 27 06      BEQ MEM1
134
135 A14A A7 06      STA A 0X
136 A14C 08      INX
137 A14D FF A1 05  STX ENADR
138 A150 BC 7F FF  MEM1  CXX ENOMEN
139 A153 27 02      CLC
140 A155 0C      RTS
141 A156 39      RTS
142 A157 0D      SEC
143 A158 39      RTS      SET MEM OVERFLOW FLAG
144
145 A159 CE A2 31  MEMOV  LDX 0MSC1
146 A15C B0 A0 1E  EXIT  JSR PSTRMG
147 A15F FE A1 03  EXIT  LDX BECADR
148 A162 BC A1 05  BEQ ENADR
149 A165 27 20      BEQ CLOSE      DON'T SAVE EMPTY FILE1
150
151 A1C7 A6 00      SAVE  LDA A 0X
152 A1C9 08      INX
153 A1CA B4 7F      AND A 017F
154 A1CC B1 20      CAP A 0120
155 A1CE 24 04      BCC SAVE1
156 A1D0 B1 0D      CAP A 010D
157 A1D2 26 0E      BNE SA 2
158 A1D4 FF A1 03  SAVE1  STX BECADR
159 A1D7 CE A8 40      BNE 5A 2
160 A1DA B0 B4 06      JSR FMS
161 A1DB 26 1A      BNE ERROR
162 A1DF FE A1 03  LDX BECADR
163 A1E2 BC A1 05  CPX ENADR
164 A1E5 26 ED      BNE SAVE

```

MODEM INPUT AS A DISK TEXT FILE

```

57 A119 B6 01      LDA A 61
58 A11B B0 A0 33      JSR SETEXT      00 .TXT
59
60 A11E CE A8 40  OPEN  LDX 0FCB
61 A121 B6 02      LDA A 02      OPEN FOR WRITE
62 A123 A7 06      STA A 0X
63 A125 B0 B4 06      JSR FMS
64 A128 27 03      BEQ ACINIT
65 A12A 7E A1 F3      JMP FILERR
66
67 A12D CE B0 00  ACINIT  LDX 0PORT0
68 A130 B6 03      LDA A 03
69 A132 C6 15      LDA B 0B15
70 A134 A7 00      STA A 0X
71 A136 E7 00      STA B 0X
72 A138 A6 01      LDA A 1X
73
74 A13A CE A2 05      LDX 0MSC4      READY MESSAGE
75 A13D B0 A0 1E      JSR PSTRMG
76 A140 B0 A0 24      JSR PCKLF
77 A143 CE 00 00      LDX 0BEGHEM
78 A146 FF A1 03      STX BECADR
79 A149 FF A1 05      STX ENADR
80 A14C 7F A0 0C      CLR PORECH
81 A14F 73 A0 0C      TERMEC COM PORECH      INITIALIZE OFF
82
83      # MAIN INPUT LOOP HERE
84
85 A152 BE B0 00  TSTDRM  LDX 0PORT0
86 A155 E6 00      LDA B 0X
87 A157 54      LSR B
88 A158 24 10      BCC 1ST3AH      TEST FOR RECEIVE BUFFER FULL
89
90 A15A A6 01      LDA A 1X
91 A15C CE B0 04      LDX 0PORT1
92 A15F B0 A1 9A      JSR DUTCHR      OUTPUT TO TERMINAL
93 A162 B0 A1 A3      JSR MEMOBY      PUT IN MEMORY
94 A165 24 03      BCC MDMI
95 A167 7E A1 B9      JMP MEMOV      ECHO ON?
96 A16A 7D A0 0C      TST PORECH
97 A16D 26 06      BNE TSTTRM
98 A16F CE B0 00      LDX 0PORT0
99 A172 B0 A1 9A      JSR DUTCHR      SET UP E NO GO DO IT
100
101 A175 CE B0 04  TSTYRA  LDX 0PORT1      EE IF RECEIVE BUFFER FULL
102 A178 E6 00      LDA B 0X
103 A17A 54      LSR B
104 A17B 24 05      BCC 1ST3AH      GO AROUND AGAIN IF NO CHARACTER
105
106 A17D A6 01      LDA A 1X
107 A17F B1 18      CMP A 061B
108 A181 27 3C      BEQ EXIT
109
110 A183 B1 05      CMP A 05
111      IS IT 1E ?

```

MODEM INPUT AS A DISK TEXT FILE

```

111 A185 27 C8      BEQ 1ERMEC      GO CHANGE ECHO MODE
112
113 A187 CE B0 00      LDX 0PORT0
114 A18A B0 A1 9A      JSR DUTCHR      OUTPUT TO MODEM
115 A18D 7D A0 0C      TST PORECH
116 A190 26 E0      BNE TSTTRM
117
118 A192 CE B0 04      LDX 0PORT1
119 A195 B0 A1 9A      JSR DUTCHR      ECHO
120 A198 20 B8      BRA TSTTRM
121
122      # SUBROUTINES
123
124 A19A E6 00      DUTCHR  LDA B 0X
125 A19C 54      LSR B
126 A19E 54      LSR B
127 A19E 24 FA      BCC DUTCHR      WAIT FOR TRANSMIT BUFFER EMPTY

```

MODEM INPUT AS A DISK TEXT FILE

```

165
166 A1E7 CE A8 40  CLOSE  LDX 0FCB      CLOSE FILE CODE
167 A1EA B6 04      LDA A 04
168 A1EC A7 00      STA A 0X
169 A1EE B0 B4 06      JSR FMS
170 A1F1 27 0C      BEQ EXITE
171 A1F3 A6 01      FILERR  LDA A 1X
172 A1F5 B1 03      CMP A 03
173 A1F7 27 0C      BEQ ASKDEL
174
175 A1F9 B0 A0 3F  ERROR  JSR RPTERR
176 A1FC B0 B4 03      JSR FMSCLS
177 A1FF 7F A0 0C  EXITE  CLR PORECH
178 A202 7E A0 03      JMP WARRS
179
180 A205 CE A2 53  ASKDEL  LDX 0MSC2
181 A208 B0 1C      BSR ASK
182 A20A 26 F3      BNE EXITE
183
184 A20C CE A2 7A      LDX 0MSC3
185 A20F B0 13      BSR ASK
186 A211 26 EC      BNE EXITE
187
188 A213 CE A8 40      LDX 0FCB
189 A216 B6 0C      LDA A 012
190 A218 A7 00      STA A 0X
191 A21A B0 B4 06      JSR FMS
192 A21D 26 DA      BNE ERROR
193 A21F A6 24      LDA A 361X
194 A221 A7 04      STA A 4X
195 A223 7E A1 1E      JMP OPEN      OPEN NEW FILE
196
197 A226 B0 A0 1E  ASK     JSR PSTRMG
198 A229 B0 A0 15      JSR GETCHR
199 A22C B4 5F      AND A 015F
200 A22E B1 59      CMP A 01Y
201 A230 39      RTS
202 A231 4D      MSC1  FCC 'MEMORY OVERFLOW SOME DATA LOST '
203 A232 04      FCC 4
204 A233 4D      MSC2  FCC 'MAY THE EXISTING FILE BE DELETED? '
205 A234 04      FCC 4
206 A235 04      MSC3  FCC 'ARE YOU SURE? '
207 A236 04      FCC 4
208 A237 04      MSC4  FCC 'READY FOR MODEM INPUT '
209 A238 04      FCC 4
210
211      EMB TERM

```

NO ERROR(S) DETECTED

MODEM COMMAND FILE

```

5
6
7
8
9
10
11
12
13
14
15
16
17
18 AC11      LASTER EDU 0AC11      LAST TERMINATOR
19 AC09      PAUSE EDU 0AC09      PAUSE FLAG FOR TERMINAL OUTPUT
20 AD1E      PSTRMG EDU 0AD1E      PRINT A STRING POINTED AT BY X
21 B403      FMSCLS EDU 0B403      CLOSE ALL OPEN FILES
22 AD03      WARRS EDU 0AD03      WARRS1 FOR FLEX
23 AC02      EDCCHR EDU 0AC02      END OF LINE CHARACTER
24 B406      FMS EDU 0B406      FILE MANAGEMENT SYSTEM CALL
25 AB40      FCB EDU 0AB40      FILE CONTROL BLOCK
26 AD34      LQAD EDU 0AD34      LOAD A BINARY FILE
27 AD06      RPTERR EDU 0AD06      RE ENTER FLEX
28 AD3F      RPTERR EDU 0AD3F      REPORT ERROR ROUTINE

```

```

29 0000 PORTO EQU 18000
30 0004 PORTI EQU 18004
31
32 A100 ORC 1A100
33
34 A100 20 01 START BRA BECIN
35 A102 01 VER TCR 1
36 A103 8A AC 11 BECIN LDA A LASTER LAST TERMINATOR
37 A106 01 08 CMP A P10D WAS IT CR?
38 A108 27 38 BEQ ERROR IF SO, SYNTAX ERROR
39 A10A 01 AC 02 CMP A 00A0CH WAS IT END OF LINE?
40 A10B 27 33 BEQ ERROR IF SO, ERROR
41 A10F 7F AC 09 CLR PAUSE DISABLE PAUSE FEATURE FOR MODEM OUTPUT
42 A112 CE A8 40 LDJ #FCH
43 A115 06 01 LDA A 01 OPEN FOR READ CODE
44 A117 A7 00 STA A 01X OPEN FOR READ
45 A119 8D 34 04 JSR FNS DO IT
46 A11C 26 05 BNE CETER ERROR ROUTINE
47 A11E 86 FF LDA A 14FF SPACE COMPRESSION FLAG
48 A120 A7 38 STA A 14FF LOAD
49 A122 8D AD 30 JSR LOAD LOAD MODEN.SYS FILE
50 A125 8D A1 75 JSR ACINIT
51 A128 7E AD 06 JMP RENTER BACK TO FLEX
52 A12B A6 01 LDA A 11X GET THE ERROR CODE
53 A12D 81 04 CMP A 44 WAS IT NO SUCH FILE?
54 A12F 26 08 BNE RPTJMP
55 A131 CE A1 47 LDJ #PSTRG NO SUCH FILE MESSAGE
56 A134 8D AD 1E JSR PSTRG PRINT MESSAGE
57 A137 20 03 BRA EXIT

```

MODEN COMMAND FILE

```

58 A139 8D AD 3F RPTJMP JSR RPTJMP
59 A13C 8D B4 03 EXIT JSR FRCLSL CLOBE ALL FILES ON ERROR
60 A13F 7E AD 03 JMP WARMG
61 A142 CE A1 50 ERROR LDJ #PSTRG
62 A145 20 ED BRA P1 PRINT MESSAGE
63 A147 22 00 SYSR FCB 4
64 A150 04 FCB 4
65 A158 43 ERSNG FCB 4
66 A174 04 FCB 4
67
68 A175 86 03 ACINIT LDA A 83
69 A177 C6 15 LDA B 815 2 STOP BITS
70 A179 B7 80 00 STA A PORTO
71 A17C F7 80 00 STA B PORTO
72 A17F B6 80 01 LDA A PORTO+1
73 A182 39 RIS
74 A844 ORC FCB+4
75
76 2 LOAD FCB WITH MODEN.SYS FILE SPEC
77
78 A844 4D FCB 4
79 A849 00 00 FCB 0
80 A84B 00 FCB 0
81 A84C 53 FCB 0
82
83 END START

```

NO ERROR(S) DETECTED

OUTPUT ROUTINE FOR MODEN

```

5
6
7 2 THIS PROGRAM, MODEN.SYS, IS AN ALTERNATE OUT UT ROUTINE
8 2 TO PUTCHR, THAT OUTPUTS THE CHARACTER IN THE A ACCUMULATOR
9 2 TO PORTS 0 AND 1, BOTH AS NP-5 ACIA INTERFACES AT THE SET
10 2 BAUD RATES.
11 2 ITS USE WILL BE TO ALLOW OUTPUT TO THE MODEN FOR UTILITIES
12 2 SUCH AS CAT, LIST, ETC.
13
14 2 THE SYNTAX IS:
15 2 M-LIST/FILENAME
16
17 2 THIS PROGRAM IS LOADED BY THE M-CHO FILE WHICH ALSO INITIALIZES
18 2 THE ACIA AT PORT 0.
19
20
21
22 2 EQUATES
23 AD10 OUTJMP EQU 18D10 OUTPUT CHARACTER VECTOR IN FLEX2
24 80 0 PORTO EQU 18000
25 0 34 PORTI EQU 18004
26
27 8D10 ORC OUTJMP
28 AD10 A5 02 FCB 0
29
30 A580 ORC 1A580 HEAR TOP OF UTILITY AREA
31
32 A680 XTEAP RAB 2
33
34 A582 FF A5 80 OUTJMP STX XTEAP SAVE X
35 A585 37 PSH B SAVE REGISTERS
36 A586 CE 80 04 LDJ #PORTI
37 A589 8D 0A BSR ACIOUT
38 A58B CE 80 00 LDJ #PORTO
39 A58E 8D 05 BSR ACIOUT
40 A590 33 PUL B RESTORE REGISTERS
41 A591 8E A5 80 LDJ #XTEAP
42 A594 39 RTS
43
44 2 ACIA OUTPUT SUBROUTINE
45
46 A593 E6 00 ACIOUT LDA B 01X
47 A597 57 ASR B
48 A598 57 RSR B
49 A599 24 FA BEC ACIOUT WAIT FOR TRANSIT BUFFER EMPTY
50 A591 A7 01 STA A 11X
51 A59D 39 RTS
52
53 END

```

NO ERROR(S) DETECTED

FORM FEEDLESS PRINTER ROUTINE

THE ARTICLE 'PRINT.SYS FOR A JRM FEEDLESS PRINTER' BY KEN STAMM IN THE JANUARY ISSUE WAS A WELCOME SOLUTION TO A SMALL PROBLEM THAT MANY FLEX USERS, INCLUDING MYSELF, HAD RUN INTO. I AM USING AN OLD ASR-33 TELETYPE AS A PRINTER ON MY OMAT1 SYSTEM AND UP UNTIL NOW MY SOLUTION TO THE FORM FEED PROBLEM WAS TO PRINT DUMMY FILES CONTAINING ONLY LINE FEEDS BETWEEN EACH FILE IN THE PRINT QUEUE. KEN'S IDEA OF HOW TO LET THE MACHINE DO THE WORK WAS MOST APPRECIATED.

AFTER EXAMINING THE PROGRAM IN SOME DETAIL, I WONDERED IF THERE WAS A WAY AROUND THE ONLY DRAWBACK - THAT OF HAVING TO USE A PORTION OF THE USER MEMORY FOR PART OF THE DRIVER. IF THE PROGRAM COULD BE COMPRESSED TO FIT INTO THE 56 BYTE SPACE ALLOCATED BY TSC FOR THE PRINTER DRIVER, IT WOULD BE SAFELY OUT OF THE WAY OF ALL OTHER PROGRAMS.

IN ORDER TO WORK WITH FLEX, ANY PRINTER DRIVER MUST MAINTAIN THREE ENTRY POINTS - 1A0C0 FOR THE INITIALIZATION ROUTINE, 1A0D0 FOR A PRINTER READY CHECK, AND 1A0E4 FOR OUTPUTTING ONE CHARACTER. ALTHOUGH FLEX CAN EASILY BE MODIFIED TO USE OTHER ENTRY POINTS, IT IS BEST TO LEAVE IT ALONE AND MAKE THE DRIVER COMPATIBLE. REDUCING KEN'S PROGRAM FROM 89 BYTES TO FIT INTO THE SCANTY DRIVER SPACE WHILE RETAINING THE THREE ORIGINAL ENTRY POINTS PROVED TO BE QUITE A CHALLENGE.

AFTER A GREAT DEAL OF SQUEEZING, COUNTING, PACKING AND CHEATING, THE PROGRAM SHOWN HERE SEEMS TO DO THE TRICK. THE CODE MAY SEEM QUITE MIXED UP, BUT PLW-CHEATING IT HELPS TO MAKE SENSE OUT OF THE ADDRESS. (REFER TO KEN'S ARTICLE FOR AN EXCELLENT DESCRIPTION OF THE PROBLEM AND THE SOLUTION.)

ENTRY TO THE CHARACTER OUTPUT POINT (1A0E4) FIRST CHECKS TO SEE IF THE CURRENT CHARACTER IS A FORM FEED (1A0C). IF NOT, THE ROUTINE 'OUT' IS ENTERED, PRINTING THE CHARACTER AND UPDATING THE LINE COUNT. IF THE CHARACTER IS A LINE FEED, THE RTS AT 'RTN' RETURNS CONTROL TO THE CALLING PROGRAM AT THIS POINT.

IF THE CHARACTER RECEIVED IS A FORM FEED, IT IS CONVERTED INTO A LINE FEED AND THE ROUTINE 'OUT' IS CALLED AS A SUBROUTINE WITHIN A LOOP. THE LOOP CONTINUES TO CALL 'OUT' UNTIL THE PROPER NUMBER OF LINE FEEDS ARE PRINTED. THE CARRY SERVES AS A FLAG TO ALLOW THE LOOP TO BE EXITED. NOTE THAT THE 'CHPA' AT 1A0E4 WILL CLEAR THE CARRY FLAG AFTER EACH LINE FEED IS PRINTED. WHEN THE LINE COUNT IS FINALLY DECREMENTED TO ZERO AND RESET, THE 'SEC' INSTRUCTION TRIGGERS AN EXIT FROM THE LOOP. THE DRIVER THEN EXITS THROUGH THE 'PCHK' ROUTINE (WHICH DOES NOTHING HERE BUT SAVE ONE BYTE OF CODE).

I'M AFRAID I HAD TO LEAVE OUT KEN'S DESIRABLE PARITY STRIPPING BEFORE THE CHARACTER TESTS, BUT A CHECK OF THE SOFTWARE I HAVE WHICH WOULD USE THIS DRIVER INDICATED THIS WOULD CREATE NO PROBLEMS. WHO WILL BE THE FIRST TO SQUEEZE TWO MORE BYTES OUT OF THE PROGRAM AND PUT BACK THE PARITY STRIPPING?

```

* PRINT.SYS DRIVER FOR OMAT1 FLEX 1-0
* FOR ACIA ON PORT #0
*
* WILL DECODE FORM FEED - 1A0C
* DERIVED FROM PROGRAM BY KEN STAMM
* '68' MICRO, JANUARY 1980, PAGE 34
*
* SET PAGESIZ TO NUMBER OF LINES/PAGE
*
* JOHN K. JORDAN
* 103 ELLIOTT CIRCLE
* OAK RIDGE, TN 37830
* JAN. 80

```

```

0000 ACIA EQU 18000 ACIA ADDRESS
0042 PAGESIZ EQU 66 NUMBER OF LINES/PAGE
*
* ORC 1A0C0
*
* INITIALIZE ACIA INTERFACE
*
AC00 86 03 PINIT LDA A 83
AC02 87 80 00 STA A ACIA
AC05 86 11 LDA A 1A11
AC07 87 80 00 STA A ACIA
*
AC0A 86 4E RESET LDA A 1A0E4 RESET LINE COUNT
AC0C 37 AC 01 STA A LINCNT
AC0F 0D SEC SET FLAG FOR LOOP CHECK
AC10 39 RTS
*
AC11 LINCNT RAB 1 LINE COUNT (REMAINING)
*
AC12 86 0A PLF LD A 1A0A PRINT LINE FEEDS
AC14 8D 12 LOOP BSR OUT
AC16 8A FC BCC LOOP RETURN THRU PC K
*
* PRINTER READY CHECK
*
AC18 37 PCHK PSH B
AC19 76 8D 0D LDA B ACIA GET STATUS BIT
AC1B 56 ROR B ROTATE INTO BIT 7
AC1C 56 ROR B
AC1D 56 ROR B
AC1E 33 PUL B
AC1F 39 RTS
*
AC21 87 E7 CMST B80 RESET RESET LINE COUNT
AC23 39 RTN
*
* OUTPUT ONE CHARACTER TO PRINTER
*
AC24 81 0C POUT CMP A 1A0C IS IT A FORM FEED?
AC26 2A EA BEO PLF YES, 00 PRINT LINE FEEDS

```

```

ACED      OUT      EQU      *      P INT CHARACTER
ACED 8D EE      BSR      OUT      WAIT TILL PRINTER READY
ACED 2A FC      SPL      OUT      WRITE CHARACTER
ACED 87 80 01    STA A      ACIA+1  WAS CHR. A LINE FEED?
ACED 81 0A      CHP A      #30A    NO. RETURN DISE...
ACED 86 FC      BSR      RTN      DECREMENT LINE COUNT
ACED 7A AC D1    DECHT     DEC      LINCNT
ACED 2 29      BRA      CRST     00 RESET IF NEEDED
                                END

```

NO ERROR(S) DETECTED

SYMBOL TABLE

```

ACIA 8000  CK ST  AC11  DECHT  AC13  LINCNT  AC01  LUMP  AC04
OUT      ACED  PAOSIZ 0042  PGHK  AC06  PINIT  AC00  PLF  AC02
POUT     AC2A  RESET  AC0A  RTN

```

COMMUNICATIONS PROGRAM MODEM

Ches Looney
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Interest in Computer Bulletin Boards is growing and is likely to continue to grow since it provides an interesting by-product to the hobby of home computer programming and use. Many computers require separate terminals which can readily be connected to a modem and used to access a bulletin board; however, this is often a nuisance involving disconnecting the terminal from the computer and possibly losing the use of a printer or other peripheral device.

The accompanying listing is of a 6800 assembly language program for a computer with a serial port (Port 1) for the terminal and another serial port (Port 2) for connection to a modem. The bit rate should be fixed at 300 baud for Port 2, but may be any rate compatible with the computer and terminal for Port 1.

The minimum system required to use the program is a terminal, a computer, and a modem. The modem I have found useful is the PennWhistle 103 which serves as an interface device for the recording of cassette tapes as well as for use as an acoustic-coupled modem to communicate with distant computers by telephone lines.

The program is commented, but a few additional comments may be helpful. Lines 0100 through 0107 reset the ACIA's by transmitting 83 to each device. Lines 0109 through 0100 set both devices for the most commonly used protocols: 7 bits of data, Even Parity, and 1 Stop Bit. Lines 010F-0113 and 0123-0129 wait until data is either available from the terminal or incoming through the modem. If data is coming from the terminal, it is transmitted by lines 0115 through 0123. If information is available from the modem, lines 0126 through 0133 send it to the terminal.

This section also looks for a "BREAK" character which I arbitrarily selected as HEX 1F. Upon receipt of this character, the ACIA is sent the value of 61 which it interprets as the command to shift and hold the audio frequency until a reset command is received. After a brief delay, the program is re-initiated, the ACIA is reset, and normal operation is resumed. This activity just described is performed by lines 0137 through 013E.

In addition to performing a useful function, the program is an interesting example displaying the versatility and convenience of the 6850 Asynchronous Communications Interface Adapter (ACIA).

```

LOCH B1 B2 B3
0000      >*****
0000      >
0000      >  RS-232 COMMUNICATIONS ROUTINE FOR THE
0000      >  SUTP 6800 COMPUTER
0000      >
0000      >*****
0000      >
0000      >  DEFINITIONS:
0000      >
0000      >  P1CR EQU #0004  PORT 1 CONTROL AND STATUS REGISTERS
0000      >  P1DR EQU #0008  PORT 1 DATA REGISTER
0000      >  P2CR EQU #0008  PORT 2 CONTROL AND STATUS REGISTERS
0000      >  P2DR EQU #0009  PORT 2 DATA REGISTER
0000      >  DELA EQU #E2C2  SUBROUTINE
0000      >
0000      >  PROGRAM:
0000      >
0000      >  ORG $100
0000      >
0100 C6 B3      >  INIT LDAB #3  TO RESET ACIA'S
0102 CE 00 04    >  LDX #P1CR  SET INDEX TO PORT 1
0105 E7 00      >  STAB 0,X  RESET PORT 1
0107 E7 04      >  STAB 4,X  ESET PORT 2
0109 86 49      >  LDAB #49  TO CONFIGURE ACIA'S TO 78+EP+ISB
010B A7 00      >  STAB 0,X  CONFIGURE PORT 1
010D A7 04      >  STAB 4,X  CONFIGURE PORT 2
010F 86 01      >  R1 LDAB #1  PREPARE TO CHECK PORT 1 FOR DATA
0111 A4 00      >  ANDA 0,X  ANY DATA FROM PORT 1?
0113 27 10      >  BEQ R2  IF NOT, CHECK PORT 2
0115 A6 01      >  LDAB 1,X  IF SO, LOAD DATA IN ACC A
0117 81 1F      >  CMBA #1F  IS IT THE BREAK (1F) CHARACTER?
0119 27 1C      >  BEQ 0,X  IF SO, GO BREAK PORT 2
011B 86 02      >  LDAB #2  IF NOT, PREPARE TO TRANSMIT
011D E4 04      >  T2 RMB 4,X  IS PORT 2 READY TO SEND?
011F 27 FA      >  BEQ T2  IF NOT, CHECK AGAIN
0121 A7 05      >  STAB 5,X  IF SO, SEND DATA OUT PORT 2
0123 20 EA      >  BRA R1  AND GO CHECK PORT 1 FOR MORE DATA
0125 86 01      >  R2 LDAB #1  PREPARE TO CHECK PORT 2 FOR DATA
0127 A4 04      >  ANDA 4,X  ANY DATA FROM PORT 2?
0129 27 E4      >  BEQ R1  IF NOT, LOOK AT PORT 1
012B A6 05      >  LDAB 5,X  IF SO, LOAD DATA IN ACC A
012D C6 02      >  T1 LDAB #2  PREPARE TO TRANSMIT
012F E4 00      >  RMB 0,X  IS PORT 1 READY TO TRANSMIT?
0131 27 FA      >  BEQ T1  IF NOT, CHECK AGAIN
0133 A7 01      >  STAB 1,X  IF SO, SEND DATA OUT PORT 1
0135 20 EE      >  BRA R2  AND GO CHECK PORT 2 FOR MORE DATA
0137 86 61      >  RMB LDAB #61  PREPARE TO BREAK PORT 2
0139 A7 04      >  STAB 4,X  BREAK PORT 2
013B 8D E2 C2    >  JSR DELA  WAIT A BIT ...
013E 20 08      >  BRA INIT  AND START OVER
0140      >
0140      >  END

```

DOCUMENT (TSC BASIC)

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The following program is a document preparation program, written in TSC Extended Basic, but should also be compatible with TSC Integer Basic. Some of the advanced features of TSC Extended were not used. This program was written for Gilbert G. Olsen and Associates, Inc. Financial Consultants, and is published with their permission. It is intended for use with a terminal in the scroll mode, with FLEX pause active. Provisions are made for two different printers, defined by their PRINT.SYS driver routines. PRINT.SYS can be a small 40 col printer for scratch work and PRINT2.SYS for a large printer, suitable for final document printing.

THE PROGRAM CAN BE USED TO:

- (1) Prepare a formal document such as a deed of trust (example below), or bill of sale, or any other document that is created normally by retyping a form with unique data inserted where needed. The program obtains the boilerplate data from a specially formatted disk file and receives inputs from the kbd.
- (2) It can be used to prepare one with changes in the boilerplate.
- (3) It can be used to create a whole new document boilerplate and save it on disk....
- (4) Any document of any type in the proper disk format can be processed.
- (5) A disk file record can be made of any final document for archive.

It uses a disk file, (for example TRUST.DAT below), which is specially formatted. The disk file is read by the program one string at a time. If the text is part of the 'Bollerplate' it is stored in a string array. When a '///' marker is read from the file, the rest of the string is printed (but not stored) as a prompt. Then the program gets an input from the keyboard. Other special markers used are:

\$\$\$-end of document

The first line of a document is interpreted as the title and it will be underlined as part of the program. Any other underlining must be done as part of the document.

The program has its own logic to prevent line foldover in the middle of a word, therefore `ttysw` width should be set to zero for use. Line 16, variable `Q1=79` may need to be changed if your printer is not an 80 column printer. Set `Q1` to the number of columns you desire or the max number less one.

BASIC SOURCE LISTING

[illegible]

TRUST.DAT (RAW) FILE LISTING
----INTENTIONALLY ABBREVIATED----

[illegible]

```

100  REM  PASS PARAMETER'S FROM THE COMMAND LINE IN FLEX TO BASIC.
110  REM
120      This little routine will take a parameter from
130  REM  the command line of FLEX and pass it to BASIC as A$ !!!
140  REM
150  REM  The syntax is:
160  REM

```

```

170 REM ***BASIC-<basic file spec>,<parameter>
180 REM
190 REM Where 'basic file spec' is the program with this routine
200 REM in it and 'parameter' is the information you want to
210 REM send to it. If 'parameter' is missing the routine will
220 REM tell you by testing the length of A$.
230 REM
240 REM Frank Moss
250 REM Frank Moss Dental Laboratory
260 REM 700 East Water Street
270 REM 130 Midtown Place
280 REM Bureaucracy New York 13210
290 REM 315-474-7856
300 REM
310 REM
320 CC= HEX('AC10') REM FLEX current character
330 EL= PEEK(HEX('AC02')) REM FLEX end of line character
340 CR= HEX('0D') REM Carriage Return
350 GT= HEX('AD27') REM FLEX GETCH subroutine
360 DPOKE HEX('24'), GT REM Set the USR function to the FLEX
370 REM GETCH subroutine.
380 REM
390 REM Call GETCH which will set the next
400 REM character from the line buffer and
410 REM put it in CURRENT CHARACTER.
420 REM
430 REM Then check to see if it's the end.
440 REM
450 IF PEEK(CC)=EL OR PEEK(CC)=CR GOTO 530
460 REM
470 REM Now build up A$ with the parameter.
480 REM
490 A$=A$+CHR$(PEEK(CC)) GOTO 410
500 REM
510 REM See if A$ has anything in it.
520 REM
530 IF LEN(A$)<1 GOTO 560 ELSE GOTO 600
540 REM
550 REM
560 PRINT "THERE WAS NO PARAMETER IN THE COMMAND LINE I I"
570 GOTO 610
580 REM
590 REM
600 PRINT "YOUR PARAMETER IS "A$
610 END

```

A FAST 8 CHANNEL 10 BIT A/D CONVERTER

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College Station, TX 77840

As more and more emphasis is being placed on the environment, ecology, and natural resources the micro computer is becoming the perfect tool for both personal and organized research in these and other areas. With proper interfacing to the outside world, the micro can consume great quantities of data unattended, process it, and present the results in human digestible form as a summary report with the right software. Whether your application would be a pet solar panel design or race car tuning, believable results are not obtained simply because they come out of a computer, but because of high quality, high resolution interfacing. This article describes just such an interface in the form of an eight-channel, ten-bit, high-speed analog to digital converter designed to plug into a 55-50 I/O slot. Even though cost was considered in the design and kept to a reasonable level, this is not a low budget system where accuracy is traded for cost. These types of converters do indeed have their place and should be considered for certain applications, but not serious research where high precision and resolution is required.

HARDWARE

Before you turn the page, I might mention the cost (in parts) for the complete A/D board is about \$60.00 for the 10 bit version. The design of the A/D board is straightforward with the heart of the board being a relatively new Analog Devices AD571, a ten-bit successive approximation A/D converter. This great little I.C. is fest with a typical conversion time of 25 μ s or 40,000 conversions per second, with a built in voltage reference, clock, comparator, output buffers, and a full scale calibration accuracy of $\pm 0.3\%$ without external trims; what could be simpler?

The circuit was designed to plug into the I/O bus of SUTPC 6800 with no system modifications. The complete circuit is shown in Figure 1 and could either be built up on a wire wrap board, such as available from Seoke Signal Broadcasting, or a printed circuit board as did the author, Figure 2.

The design is straightforward with a 6821 PIA doing the work of inter-

facing the 571 to the data bus. Since the 571 is a ten-bit device, a resolution of 1 part in 1024, all of the A and two bits of the B register are used to transfer the data bits. If reduced resolution can be tolerated, 1 part in 256, only the A side would need to be used for eight bit data. This would not only produce a saving in software, but also in cash since Analog Devices came out with the AD570 which maintains all the specifications of the 571 but with only an eight bit output at a cost of \$22.50 each compared to \$37.50 for the AD571J0. The only different pin numbers to be used with the 570 are associated with the data lines which are circled in the diagram and PIA B₀ AND B₁ lines should be left open. Before selecting the eight bit configuration the intended application and future applications should be carefully considered as to required resolution. For example, if temperature is to be measured up to 212° F the output would take 1° F steps and be accurate to $\pm 1^\circ$ F or ± 1 LSB. Personally I believe the difference in price is small compared to the ten-bit capability.

The high order nibble of the PIA B register is used to select the desired data channel by means of the Analog Devices AD7501 analog multiplexer. The inputs to the multiplexer are semi-protected by current limiting resistors, but could still be zapped by higher than maximum input voltages which are nominally ± 15 VDC. The output of the 7501 is buffered by a high speed LM310 follower since the 571 has a relatively low input impedance of about 5K ohms. Do not try to substitute a 741 or 301, they're slew rate is too slow to allow channel switching. The optional jumper between pins 15 and 16 of the 571 determines the input levels and polarities. With the jumper installed the input will be set to 0 to +10 volt range, and with the jumper removed the input has a ± 5 volt range with an offset binary output code. A programmable gain amp could have been included, but for the sake of simplicity input conditioning is handled externally. A sample hold, which is normally used in successive conversion converters, has also been omitted from this system since the conversion time is very short compared to typical slew rates which will be discussed later. All power is supplied to the board from the bus connector with the ± 12 volts clamped by zeners to compensate for the not-too-stable SUTPC ± 12 volt power supply. The analog and digital commons should be connected at the AD571 only to prevent ground loops as shown in Figure 1.

SOFTWARE

Operation of the A/D board is fairly simple if one has mastered the mysteries of the 6821. A conversion cycle is initiated when the PIA CB2 line is brought from a high to a low state. The CB1 input line acts as a conversion complete indicator by going from high to low. This transition can either set a flag (BIT 7 in PIAB0) or cause an interrupt if so programmed. BIT 7 must be reset by doing a dummy read of PIAB0. Listing 1 is CONVERT which is one example of software providing channel selection, conversion and data handling with the board plugged in I/O PORT 7. Even though this program has not been optimized for speed (initializes PIA each loop) it produces only a 75 μ s overhead in addition to the 25 μ s conversion time which should be adequate for most applications. The example listing was written to fit at the high end of 16K to be a USR program for Basic but could easily be relocated. Prior to executing CONVERT the required channel number, between 0 and 7, is loaded into CHANL either by a Basic poke or from an assembly program. CONVERT is then executed by a JSR or a Basic USR jump. The PIA is setup, the multiplexer channel number selected and a conversion pulse is sent to the AD571. A loop is then entered testing for the 571 data ready line to return low, typically 25 μ s later. PIA data registers A and B then contain the ten data bits from the output of the 571. The channel number also appears in data register B and must be stripped off before B data is valid. The eight low order bytes are placed in LDATA and the two high order bytes are placed in HDATA prior to a RTS. Listing 2 is a program to check out the board for proper operation. CONVAT needs to be loaded as in listing 1 prior to running TESTIT. After starting the program at \$0100 the channel number desired is typed in (0-7) and the converted data is outputted, in hex, between 0000 and 03FF.

USE

The main program could read DATA directly from the PIA to shorten CONVERT a few more bytes along with initializing the PIA just once. In Basic it is a simple matter to recombine the high and low order bytes by doing two peeks then multiplying the high order byte by 256 and adding it to the low order byte. This results in an integer between 0 and 1023 which is then multiplied by a constant to yield engineering units. If high speed digitizing is required, while using Basic, another USR program would need to be created to execute @CONVRT and place the results directly and sequentially in RAM for later processing by using peeks.

As with all A/D converters the maximum input data frequency should be limited to a percentage of the sample rate for accurate reproduction. A rule of thumb is about 20% or in other words the sample rate should be 5 times the maximum input frequency. Based on the example program, the maximum sample rate would be about 10,000 conversions per second or a maximum data frequency of 2KHz which should be lowpass filtered if higher frequencies could be expected.

Several of these A/D boards are currently in use in research laboratories collecting not only large amounts of data in a short amount of time, but reliable data. One of these A/D boards is also an integral component in a 6800 system performing environmental studies in the author's home by sensing temperatures, air conditioner usage and solar radiation. Hopefully this A/D will open up many applications previously requiring more costly components to achieve the required speed, resolution, or accuracy.

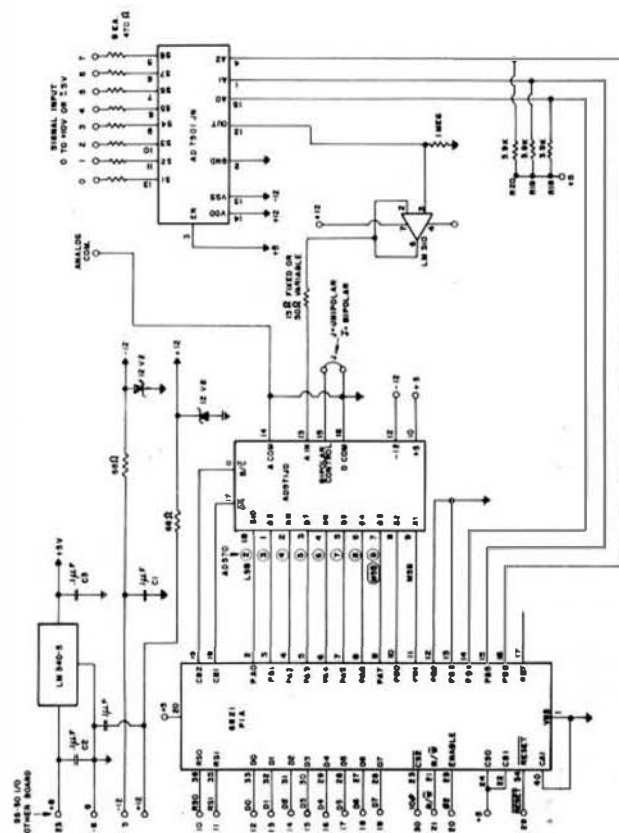
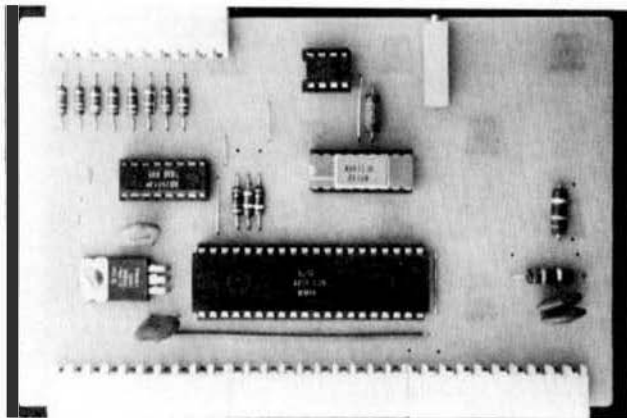
8 Channel - 10 Bit A/D Converter Subroutine, CONVRT

3F00	00	CHANL	CHANNEL NUMBER
3F01	00	HIDATA	HIGH ORDER BYTE
3F02	00	LODATA	LOW ORDER BYTE
3F03	36	CONVRT	PSHA
3F04	7F 801C		CLR S 801C
3F07	86 04		LDA A #04
3F09	87 801D		STA A #801D
3F0C	86 F0		LDA A #F0
3F0E	87 801E		STA A #801E
3F11	86 3C		LDA A #3C
3F13	87 801F		STA A #801F
3F16	86 3F00		LDA A CHANL
3F19	48	ASL	SHIFT TO HIGH-NIBBLE
3F1A	48	ASL	
3F1B	48	ASL	
3F1C	48	ASL	
3F1D	87 801E		STA A #801E
3F20	86 34		LDA A #34
3F22	87 801F		STA A #801F
3F25	70 801F	LOOP	TST #801F
3F28	2A FB		BPL LOOP
3F2A	86 801C		LDA A #801C
3F2D	87 3F02		STA A LODATA
3F30	86 801E		LDA A #801E
3F33	84 03		AND A #03
3F35	87 3F01		STA A HIDATA
3F38	32		PULA
3F39	39		RTS

A/D Test Program, TESTIT

0100	08 3F01	TESTIT	LDX #3F01	Point To Data Loc.
0103	86 00		LDA A #00	Output CH/LS
0105	8D B1D1		JSR OUTHEX	
0108	86 0A		LDA A #0A	
010A	8D 21D1		JSR OUTHEX	
010D	8D 800A		JSR INHEX	Input Ch. #
0110	87 3F00		STA A CHANL	Select Ch. #
0113	86 20		LDA A #20	Output a Space
0115	8D B1D1		JSR OUTHEX	
0118	8D 3F03		JSR CONVRT	Digitize
011B	8D 80C8		JSR OUTHEX	Print Data In Hex
011E	20 80		BRA TESTIT	Do Again

Start TESTIT at \$0100 with CONVRT loaded.
Type in channel number, 0 to 7.
Converter output will be displayed in hex. between \$0000 and \$03FF



JPC PROGRAMMABLE CLOCK KIT

JPC Products Company has announced a new addition to their product line, the CK-7 programmable clock board. The CK-7 is a self contained hardware clock, except for the optional backup power supply.

The board plugs into the thirty pin buss and contains a crystal oscillator and a clock chip which requires no attention from the system processor, except for setting the time or polling the board to read the time. Use of the optional external power supply enables the clock board to keep the time even though the computer is turned off. All that is required to read the time after the computer has

been turned off is calling the initialization routine for the port which contains the board and a call to the read time routine. Software is provided to set and read the clock in assembly language and a read time routine in BASIC. Since my system is a 6809 I had to reassemble the program for the 09.

Also since there are several calls to routines such as OUT2HEX, OUTHEX, and IN2HEX which are unique to SWTBUG type monitors, these routines had to be cross-assembled to the 09 system. While I was at it, I was able to make the whole program fully relocatable, although the original program only contained one fixed reference. The CK-7 will also provide programable interrupts to the system at intervals of 1/60 sec, 1 sec, 10 sec, 1 min, 10 min, and 1 hr.

The board which was sent for evaluation was factory assembled. When the accuracy was checked it was within one second in two days without any tweaking of the oscillator. The circuit board has plated through holes and is of good quality. I feel that the CK-7 would be a valuable addition to any 68XX system.

A lab rating of AAA. Information on the CK-7 may be obtained from:

JPC PRODUCTS CO.
P.O. BOX 5615
ALBUQUERQUE, N.M. 87185
505 294-4623

Ed's Note: The following listings are provided for those who have the kit and have upgraded to the 6809 and need 6809 code for the system. The following two programs are not offered as examples of good 6809 programming. They are rehashed from the 6800 code furnished by JPC. However, they do work and will get you going. We would request that if any of your have routines for this kit please let us know, and we will pass them along for the rest of our readers, who are using this board.

```

10 REM CLOCK ROUTINE
20 REM LINE 9180 'END' SHOULD BE CHANGED
30 REM TO GOSUB AND CALL BY USING PROGRAM
40 P1=57352: C1=57353: REM PORT A
50 P2=57354: C2=57355: REM PORT B
60 POKE C1,0:POKE C2,0
70 POKE P1,0:POKE P2,28
80 POKE C1,4:POKE C2,4
90 REM T(3) MUST BE JUMPED OVER EACH TIME
100 REM THIS ROUTINE IS CALLED DURING EACH
110 REM PROGRAM - EXCEPT FOR THE INITIAL
120 REM CALL TO THIS ROUTINE!!!!
130 REM OTHERWISE AN ERROR #43 WILL OCCUR
140 REM OR SOME OTHER ERROR NUMBER!!!!!!
150 REM THE BEST IS TO MOVE IT TO THE TOP OF
160 REM PROGRAM SO THAT IT IS ONLY CALLED ONCE.
170 DIM T(3)
180 DATA 28,12,20,16,8,24
190 FOR I%=1 TO 3
200 READ X: GOSUB 310
210 Z%=Y%
220 READ X: GOSUB 310
230 T(I%)=10*Z%+Y%
240 NEXT I%
250 M$="AM"
260 IF T(1)>12 THEN T(1)=T(1)-12:M$="PM"
270 PRINT #0,"TIME:";
280 PRINT #0,T(1);":":T(2);T(3);M$
290 REM CHANGE 'END' TO RETURN IN PROGRAM
300 RESTORE: END
310 POKE P2,X
320 Y%=PEEK(P1)
330 Y%=Y%-240
340 RETURN

```

1		F806	GASC	EQU	\$F806
2		F80A	PASC	EQU	\$F80A
3		C003	FLEX	EQU	\$C003
4		E008	PRTA	EQU	\$E008
5		E009	CTLA	EQU	\$E009
6		E00A	PRTB	EQU	\$E00A
7		E00B	CTLB	EQU	\$E00B
8		FB10	PSTG	EQU	\$FB10
9	0000 17	009B	DEMO	LBSR	INIT
10	0003 86	0F		LOA	#50F
11	0005 87	E00B		STA	CTLB
12	0008 86	18		LOA	#518
13	000A 87	E00A		STA	PRTB
14	000D 30	8D 0015		LEAX	INHR,PCR
15	0011 BF	0FC8		STX	\$0FC8
16	0014 86	E00A		LOA	PRTB
17	0017 12			NOP	
18	0018 1C	EF		CLI	
19	001A AD	9F F806	DUMB	JSR	[GASC]
20	001E 86	04		LOA	#04
21	0020 87	E00B		STA	CTLB
22	0023 7E	C003		JMP	FLEX
23	0026 86	00	INHR	LOA	#50D
24	0028 AD	9F F80A		JSR	[PASC]
25	002C 80	5C		BSR	TDIS
26	002E 86	18		LOA	#518
27	0030 87	E00A		STA	PRTB
28	0033 86	E00A		LOA	PRTB
29	0036 38			RTI	
30	0037 7F	E009	TSET	CLR	CTLA
31	003A 7F	E00B		CLR	CTLB
32	003D 86	3F		LOA	#53F
33	003F 87	E00A		STA	PRTB
34	0042 86	04		LOA	#4
35	0044 87	E009		STA	CTLA
36	0047 87	E00B		STA	CTLB
37	004A 86	3A		LOA	#1:
38	004C AD	9F F80A		JSR	[PASC]
39	0050 B0	0123		JSR	BADR
40	0053 AF	8D 014E		STX	SETN,PCR
41	0057 86	11		LOA	#511
42	0059 87	E00A		STA	PRTB
43	005C 80	54	TSE2	BSR	TIME
44	005E 40			TSTA	
45	005F 26	FB		BNE	TSE2
46	0061 86	12		LOA	#512
47	0063 87	E00A		STA	PRTB
48	0066 8D	4A	TSE3	BSR	TIME
49	0068 30	8D 0138		LEAX	HOUR,PCR
50	006C AE	84		LOX	X
51	006E AC	8D 0133		CPX	SETN,PCR
52	0072 26	F2		BNE	TSE3
53	0074 86	03		LOA	#503
54	0076 B7	E00A		STA	PRTB
55	0079 86	2B		LOA	#1+
56	007B AD	9F F80A		JSR	[PASC]
57	007F AD	9F F806		JSR	[GASC]
58	0083 8D	19	TIME0	BSR	INIT
59	0085 8D	03		BSR	TDIS
60	0087 7E	C003		JMP	FLEX
61	008A 8E	0199	TDIS	LOX	MSG
62	008D AD	9F FB10		JSR	[PSTG]
63	0091 8D	1F		BSR	TIME
64	0093 30	8D 0110		LEAX	HOUR,PCR
65	0097 17	00EF		LBSR	PHX2
66	009A 17	00F4		LBSR	PHX
67	009D 39			RTS	
68	009E 7F	E009	INIT	CLR	CTLA
69	00A1 7F	E00B		CLR	CTLB
70	00A4 86	1C		LOA	#51C
71	00A6 87	E00A		STA	PRTB
72	00A9 86	04		LOA	#04
73	00AB 87	E009		STA	CTLA
74	00AE 87	E00B		STA	CTLB
75	00B1 39			RTS	
76	00B2 6F	8D 00F4	TIME	CLR	FLAG,PCR
77	00B6 86	18		LOA	#518
78	00B8 8D	4A		BSR	DGIT

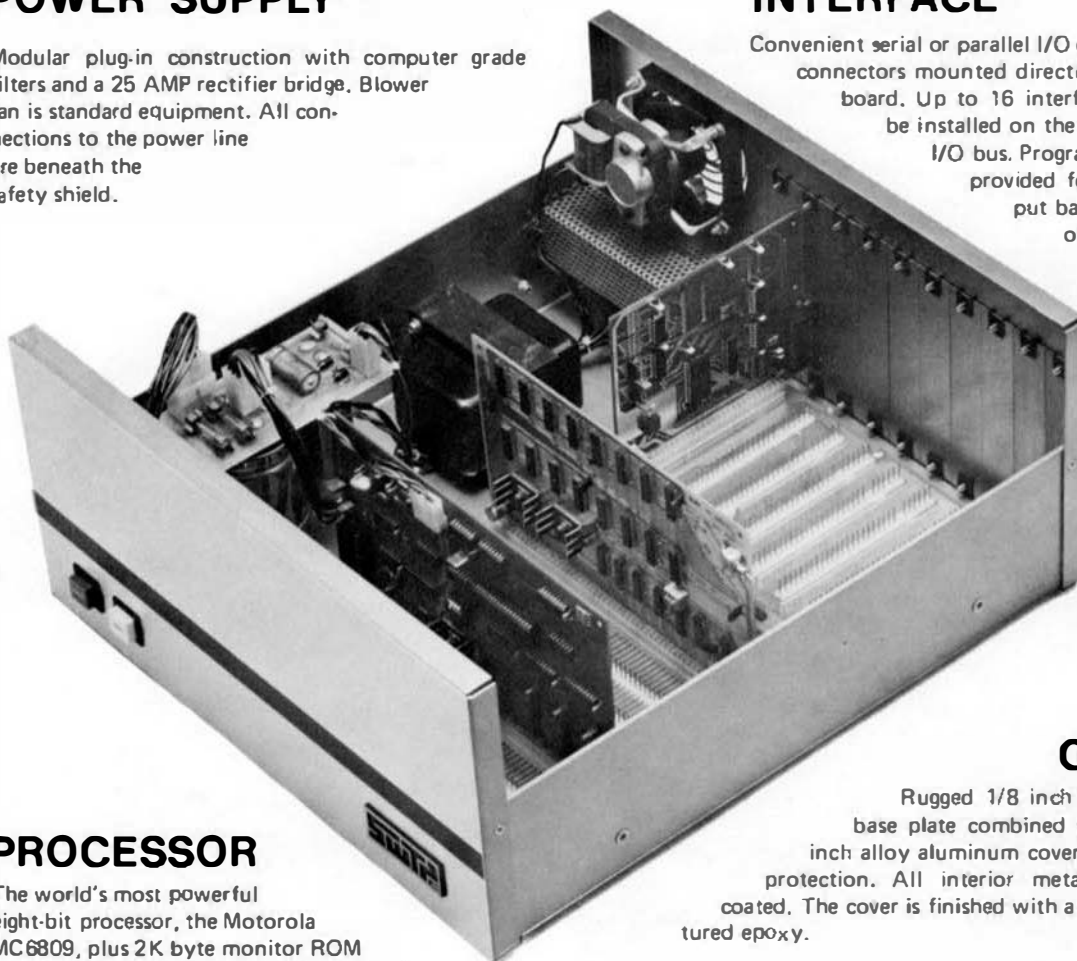
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Rugged 1/8 inch alloy aluminum base plate combined with a solid 1/8 inch alloy aluminum cover for unsurpassed protection. All interior metal is conversion coated. The cover is finished with a super tough textured epoxy.

MEMORY— You can purchase the computer with either 8K bytes of RAM memory (expandable to 56K), or with the full 56K. The efficient, cool running dynamic memory used in this system is designed and manufactured for us by "Motorola Memory Systems Inc."

PERIPHERALS— The wide range of peripheral hardware that is supported by the 6809 includes: dot matrix printers (both 80 and 132 column), IBM Electronic 50 typewriter, daisy wheel printers, 5-inch floppy disk system, 8-inch floppy disk systems and a 16 megabyte hard disk.

SOFTWARE— The amount of software support available for the 6809 is incredible when you consider that it was first introduced in June, 1979. In addition to the FLEX9 operating system, we have a Text Editor, Mnemonic Assembler, Debug, Sort-Merge, BASIC, Extended BASIC, MultiUser BASIC, FORTRAN, PASCAL and PILOT.

69/K Computer Kit with 8K bytes of memory	\$ 495.00
69/A Assembled Computer with 8K bytes of memory	\$ 595.00
69/56 Assembled Computer with 56K bytes of memory.	\$1,495.00



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Obviously a business system should be able to operate with multiple terminals if needed. It should also be able to do a variety of jobs; not just data processing, but also word processing and computer aided instruction. With a system limited to 64K bytes of memory addresses such a system is just not practical. The amount of user memory available to each terminal is too small for useful work.

HOW DO YOU GET IT—

The common solution to this problem is called bank switching. This process is similar to a selector switch that turns on the bank of memory that you want to work with. This, however, has a few problems. It is inefficient, therefore expensive, plus being slow. It is also extremely clumsy when data must be exchanged between two different programs. Besides with all this you still cannot use more than 64K of memory for any one program. So what is the alternative?

DO IT RIGHT—

The alternative is an address bus with more than the normal 16 bits found on eight-bit microprocessors. By using 20 address bits you can, for instance, address up to a million memory locations directly.

This way you have access to any part of memory at any time without any intermediate processes. Program interaction is now no problem at all.

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So far we have a computer system with a large memory capacity and the ability to operate with many terminals, but this is not enough. You need an operating system just as sophisticated as the

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FORTRAN	
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79	008A 81	F9	CMFA	#SF9
80	008C 26	04	BNE	TIM2
81	008E 6C	8D 00E8	INC	FLAG,PCR
82	00C2 86	1C	LDA	#S1C
83	00C4 8D	3E	BSR	DGIT
84	00C6 1F	894D	TAB	
85	00C9 86	0C	LDA	#S0C
86	00CB 8D	37	BSR	DGIT
87	00CD 8D	4B	BSR	DGIT
88	00CF A7	8D 00D4	STA	HOUR,PCR
89	00D3 86	14	LDA	#S14
90	00D5 8D	2D	BSR	DGIT
91	00D7 1F	894D	TAB	
92	00DA 86	10	LDA	#S10
93	00DC 8D	26	BSR	DGIT
94	00DE 8D	3A	BSR	PACK
95	00E0 A7	8D 00C4	STA	MINU,PCR
96	00E4 86	08	LDA	#08
97	00E6 8D	1C	BSR	DGIT
98	00E8 1F	894D	TAB	
99	00EB 86	18	LDA	#S18
100	00ED 8D	15	BSR	DGIT
101	00EF 6D	8D 00B7	TST	FLAG,PCR
102	00F3 27	04	BEQ	TIM3
103	00F5 81	F9	CMFA	#SF9
104	00F7 26	B9	BNE	TIME
105	00F9 8D	1F	BSR	PACK
106	00FB AE	8D 00A8	LDX	HOUR,PCR
107	00FF A7	8D 00A6	STA	SECN,PCR
108	0103 39		RTS	
109	0104 34	04	PSHB	
110	0106 F6	E00A	LDB	FRTB
111	0109 C4	E3	ANDB	#SE3
112	010B 34	04 ABEO	ABA	
113	010F B7	E00A	STA	PRTB
114	0112 35	04	PULB	
115	0114 B6	E008	LDA	PRTA
116	0117 84	OF	ANDA	#S0F
117	0119 39		RTS	
118	011A 58		ASLB	
119	011B 58		ASLB	
120	011C 58		ASLB	
121	011D 58		ASLB	
122	011E 34	04 ABEO	ABA	
123	0122 39		RTS	
124	0123 8D	0F	BSR	BYTE
125	0125 A7	8D 0079	STA	XHI,PCR
126	0129 8D	09	BSR	BYTE
127	012B A7	8D 0074	STA	XLOW,PCR
128	012F AE	8D 006F	LDX	XHI,PCR
129	0133 39		RTS	
130	0134 8D	32	BSR	INHEX
131	0136 48		ASLA	
132	0137 48		ASLA	
133	0138 48		ASLA	
134	0139 48		ASLA	
135	013A 1F	894D	TAB	
136	013D 8D	29	BSR	INHEX
137	013F 34	04 ABEO	ABA	
138	0143 1F	894D	TAB	
139	0146 EB	8D 005A	ADDB	CKSM,PCR
140	014A E7	8D 0056	STB	CKSM,PCR
141	014E 39		RTS	
142	014F 7E	CD03	JMP	FLEX
143	0152 44		LSRA	
144	0153 44		LSRA	
145	0154 44		LSRA	
146	0155 44		LSRA	
147	0156 84	0F	ANDA	#SF
148	0158 8B	30	ADDA	#S30
149	015A 81	39	CMFA	#S39
150	015C 23	02	BLS	OUT
151	015E 20	04	BRA	NOTOUT
152	0160 6E	9F F80A	JMP	[PASC]
153	0164 8B	07	ADDA	#S7
154	0166 2D	F8	BRA	OUT
155	0168 AD	9F F806	JSR	[GASC]
156	016C 8D	3D	SUBA	#S30
157	016E 2B	0F	BMI	ERROR
158	0170 81	09	CMFA	#S9

159	0172 2F	0A	BLE	INIHG
160	0174 81	11	CMFA	#S11
161	0176 2B	D7	BMI	ERROR
162	0178 81	16	CMFA	#S16
163	017A 2E	D3	BGT	ERROR
164	017C 8D	07	SUBA	#7
165	017E 39		INIHG	RTS
166	017F A6	84	OUT2H	LDA
167	0181 8D	CF	OUT2HA	BSR
168	0183 A6	84		LDA
169	0185 3D	01		INX
170	0187 2D	CD		BRA
171	0189 8D	F4	PHX2	BSR
172	018B 86	3A		LDA
173	018D AD	9F F80A		JSR
174	0191 8D	EC	PHX2	BSR
175	0193 86	2D	OUTS	LDA
176	0195 6E	9F F80A		JMP
177	0199 54	69 6D 65	MSG	FCC
	019D 2D	2D 3E 20		
178	01A1 04			FCB
179	01A2		XHI	RMB
180	01A3		XLOW	RMB
181	01A4		CKSM	RMB
182	01A5		SETN	RMB
183	01A7		HOUR	RMB
184	01A8		MINU	RMB
185	01A9		SECN	RMB
186	01AA		FLAG	RMB
187			ENO	TIMEO

THE BIT BUCKET

Where all that 'good stuff' falls.
Something for everyone.

Kens- Georg Hunger
Rudolf-Breitscheid-Str. 42
2970 Bunden
W. Germany

Bunden, B. 4. 1980

Programming 2708's with SUTP MP-R EPROM-Programmer

When I bought the SUTP MP-R EPROM-programmer in 1979 I hoped the 2716 EPROMS would soon become cheaper. But this was an error. In Germany the 2716's cost at the moment approximately 45 \$, while you can buy the 2706's for about 9 - 10 \$. There is quite a difference between these prices and so I decided to program 2708's with the MP-R.

1. The hardware

If you want to do the same you need three power supplies. 5V is granted and the +12V too. You have to generate the -5V with a zener-diode or a -5V regulator by the -12V supply. The rest (see figure 1) is easily done by supplying 2 IC's, a 74LS04 (as a buffer for IC 3) and a 7406 O.C. driver.

Only 4 pins of the 2708 have a different meaning as the 2716: Pin 18, 19, 20 and 21. Pin 18 is pulsed with 5V by Q₃ of IC 3. The 2708 must have 25V pulses (switched by IC 3). Pin 19 (A10) must get V_{DD} (+12V) by switch S_{1C}. When Q₆ of IC 3 selects the 2716 Pin 20 with 0, the IC 3 (Pin. 6) does the same. But when programming a 2708, there must be a

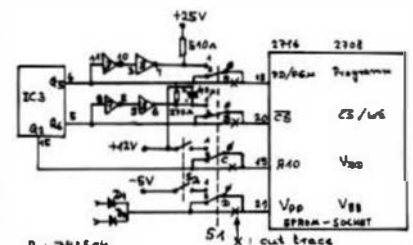


Fig. 1
S1 A-D: Contact 2 → 2716
1 → 2708
S2 open: insert or remove 2708
S2 closed: programming a 2708

+12V level. Q₆ puts out a 5V level and the D.C. of IC 8 switches +12V to 2708 pin 20. Pin 21 of the 2708 must have V_{BB} (-5V). This is done by switch S_{1D}. The +12V and the -5V supply must be switched by hand with S₂, when the EPROM is inserted into the socket and must be switched off before removing it.

2. The software

Following memory locations you must change in the M-R software:

```
04B8 BD 0C 00 CHNG1 JSR EP08-1
04C1 01 01 01
04C4 01 01
```

```
0037 00 PP 2708's capacity is only 1 KByte
```

Location 056E contains the software program pulse length. The program pulse to the 2708-EPROM should not be longer than 1 ms. So change data at 056E to 8 0075 (1 Megacycle) or, if you are running your computer with lower speed, to 8 0043 (614400 Kilocycles).

Then add a short program which sends 125 programming loops to each address of the 2708.

```
0C00 B6 7D EP08-1 LDAA #5 7D
0C02 87 A0 02 STAA A002 LOOPCT
0C05 CE 05 52 EP08-2 LDX #0552
0C08 DD 35 STX dir.
0C0A BD 05 0A JSR
0C0D 7A A0 02 DEC A002
0C10 26 03 HWS EP08-2
0C12 39 RTS
```

Routine EP08-1 should be placed in a higher memory range (use location 04BE), if you want to change the BASE ADDRESS of the DATA TABLE.

With these changes you can program 2708's without any problem by using the M-R software. The programming time is 3:40 minutes by a speed of 614400 Kilocycles.

K. J. Ruge



NOTICE OF UPDATES AVAILABLE June 10, 1980

- The original DECDPS (long integers) module, contained in SYSTEM, LIBRARY of releases prior to April 1980 will not work, as it is 6800 code instead of 6809. The new 6809 version is available to customers who mail in their serialized release diskette to CSI. CSI will bear the cost of postage one-way only, back to the customer. Please include a note describing the desired update.
- The interpreter (SYSTEM,INTPR) has undergone some subtle changes having to do with error linkage to DECDPS above and returns from assembly-language procedures. It will be replaced under the terms described above.
- The standard release BIOS now includes a driver for the COS Markman 20 M byte "Winchester" drive as vol. 012. Markman owners may obtain one of these new drivers free by mailing a blank disk, either 5 1/4" or 8" to CSI.
- USER GROUP diskette drivers are available along with a utility DIRPLP which flips the byte-sex of the directory on the USER GROUP diskette. The format is actually RT-11, with 128-byte sectors. As implemented currently it is very slow on the DMF-2 owing to sector buffering. It is available for \$20.00 prepaid by check or Mastercard/VISA.

USER GROUP INFORMATION

Reprints of all available information about Jim Gagne's group are included in this mailing with the hope that 6809 users will avail themselves of the new activity. There is every reason to believe that Jim Gagne's offerings will mushroom in number in the near future, since 8080/8085 users have been using UCSD Pascal (TM) heavily for a long time. We 6809 people are the new kids on the block and the UCSD GROUP is perhaps our first real opportunity to take advantage of the wealth of 8080, 8085, 8086, 8088, etc. effort that has been and is still being expended. Pascal 6809 users are encouraged to contact Jim Gagne directly to purchase diskettes.

David M. Allen
David M. Allen, Director
Microsystems Division

"UCSD Pascal" is a registered trademark of the Regents of the University of California.

68 Micro Journal
P.O. Box 849
Hixson, TN 37343

Douglas K. Beck
993 Lundy Lane
Los Altos, CA 94022

Dear Sirs:

I am enclosing for your consideration a review of the TSC BASIC Precompiler. The LIFE game example is a high level implementation of the 5 pass assembly language monitor submitted earlier and then recalled for remark. This one at least works, and is considerably more understandable. I hope the interspersing of tutorial comments in the program is understandable. The Precompiler makes it possible to write Pascal type statements with vanilla BASIC.

Keep up the good work there. The magazine usually yields at least one good idea each time, and that is a whole lot more than you can say for most.

Very truly yours,

Douglas K. Beck

Douglas K. Beck

REVIEW OF TSC BASIC PRECOMPILER

Enumerate the things you dislike about entering BASIC programs. Endless line numbers, cryptic initials for names, limited line length for a few. Now consider the TSC BASIC Precompiler. This relatively unsung service program takes the TSC BASIC interpreter and elevates it to near parity with its lately arrived, much heralded kin.

A sample program capable of running the LIFE game was composed using the Precompiler. It demonstrates most of the features of the program. First, variables are named by alphanumeric strings which makes the code readable. You do not have to guess at the intent anywhere. There are no line numbers, all transfer points are identified by alphanumeric labels. Second, you are not restricted to a one-to-one physical line to logical line relationship. Logical lines may be up to 255 characters long and may reside on a number of physical lines broken by a (backslash)(cr) termination. This feature makes it simple to write the constructs that are required in structured programming. Third, the process of writing a program is facilitated by being able to concentrate on the algorithm rather than how to write it down. The sample program may be verified for correctness by observing that all constructs are a "sequence", "alternation" (IF-THEN-ELSE), or a DO-WHILE loop. The algorithm may be faulty but the program is correct.

The Precompiler runs under FLEX 2.0 and permits titling, subtitling, print control, naming, suppression of reference numbers, suppression of object file creation and auto-delete of existing object file. A facility for calling library includes rounds off the package, which is available for either the tinsle precision or extended version BASIC.

The TSC BASIC Precompiler appears to be a significant advance in the area of program entry routines. The ability to forget line numbers, too short labels and too short lines for the desired construct will mean better programs in shorter times for most programmers.

Douglas K. Beck
993 Lundy Lane
Los Altos, CA 94022

May 16, 1980

- PROGRAM TO PLAY "LIFE"
- and demonstrate the TSC BASIC Precompiler
- remarks may be freely inserted at any point
- must start in column one, unless they are the
- last statement in a multiple statement logical line.
- They need not begin with an "a", any character not a letter.
- Number of underscores will do.
- The two arrays may be dimensioned to fit your memory
- and display capabilities.

```
DIM PATTERN(0:11,41)
DIM PATTERN(0:11,41)
= INITIALIZE THE ARRAY
FOR I=1 TO 10
FOR J=1 TO 40
*
*
* Logical lines may fit on a number of physical lines
* provided the physical line is terminated by a backslash.
*
IF RND(0) < 0.3 THEN PATTERN(I,J) = "o" \
ELSE PATTERN(I,J) = " "
NEXT J
NEXT I
* SET GENERATION COUNT
COUNT=1
* START PATTERN PRINTOUT
LIFE PRINT:PRINT:PRINT "GENERATION":COUNT
FOR I=1 TO 10
FOR J=1 TO 40
PATTERN(I,J) = PATTERN(I,J)
PRINT PATTERN(I,J)
NEXT J
PRINT
NEXT I
* CALCULATE NEXT GENERATION
FOR I=1 TO 10
FOR J=1 TO 40
NEIGHBORS = 0
FOR I2= I-1 TO I+1
FOR J2= J-1 TO J+1
IF PATTERN(I2,J2) = "o" THEN NEIGHBORS = NEIGHBORS+1
NEXT J2
NEXT I2
NEXT J
NEXT I
```



```

1015 IF I<A THEN GOSUB 1000
1020 I=I-1
1030 PRINT "RETURNING ON I=";I
1040 RETURN

```

RUNNING PROGRAM:

```

TEST OF RECURSIVENESS
HOW DEEP DO YOU WANT TO TEST ?4
OK AT I=1
OK AT I=2
OK AT I=3
RETURNING ON I=3
RETURNING ON I=2
RETURNING ON I=1
RETURNING ON I=0
RECURSIVE TO GREATER THAN

```

4

28 May 1980

HAM RADIO NET FOR 6800

Dear Don Williams,

I would like to inform you of the status of 6800/6809 amateur radio interest nets which I discussed in an open letter to the Journal a few months ago. From this letter I have received letters from all over the US and as far away as Europe and the Far East.

Since my last letter to the 6800 Micro Journal, the net size has been growing. The net was organized to exchange ideas, software and to help others with software and hardware problems. This has proven to be extremely helpful for those stations outside of the continental US where magazines like the 68 Micro Journal can take up to 2 months for delivery.

Our group meets on Sundays (Calif.) on 14250 KHZ at 01:00 GMT (Summer) or 02:00 GMT (Winter). The QRM is very bad at this hour and we look for the clearest frequency near 14250. After our group starts the band seems to clear up after the first hour.

Look for the following stations: HP1XAW, K500U, 9Y4JW, 9Y4RB, J6LOV; they are regulars. Numerous stations check into the net. A recent visitor to our net has been Dave Shirk, KB9JN, president of TSC. This net is proving to be an excellent way to find out what is happening in the 6800 world.

Another frequency to look for 6800/6809

users is on 21260 KHZ at 01:00/ 02:00 GMT on Fridays and Saturdays (Calif.). The following stations are regulars: VK3UM, VK2AIT, VK4XV, and K6AEP. We have been experimenting with ASCII RTTY. Our goal is to determine an optimum data rate and bit pattern to try and exchange software over amateur radio.

For amateur stations in the South Pacific wishing to meet with other 6800/6809 users, there is a local net that meets at 09:30 AM on Saturday and Sundays Eastern Australian Time. This net meets on 7140 Khz or 14160 Khz depending on band conditions. Most of the active stations are on the east coast of Australia. The net's goal is to help other stations with software and hardware problems.

I hope this letter has been of some help to stations wishing to make contact with other 6800 users via amateur radio. I would like to hear from other amateurs who are aware of other 6800 computer interest nets on amateur radio.

Sincerely,



Clay Abrams, K6AEP
1758 Comstock Lane
San Jose, CA 95124
USA

6800 DOUBLE DENSITY 8 INCH DISK SYSTEMS

Received recently from TSC is their new 6800 double-density FLEX™ for the 6800. For the users still using 6800 (and there are many) this is a welcome addition. We are aware of many who still use the 6800, because of expensive (to have written) applications software they use in their operation. The advantage of double over single density is 100%.

There is however a catch; first the new FLEX™ will not work with the older DMAF-1 SWTPC controller board (it uses a single density 1771 controller IC), this means that a newer DMAF-2 controller board will have to be purchased from SWTPC (price \$395.00 assembled). Second, the 6800 version of DISKBUG will have to have a little help or be redone on a 2716 and used on the MPA2 6800 CPU card. If you have EPROM already in this allocated area some changes are in order.

TSC will make the new DD FLEX™ available to any user who can furnish proof of purchase of 8 inch FLEX™, editor and assembler for \$40.00. All other must pay the normal price of \$90.00. The requirements for using the 8 inch boot in DISKBUG with the new DD FLEX™ is as follows:



technical systems
consultants, inc.

IMPORTANT NOTE REGARDING 6800 DOUBLE-DENSITY FLEX™

The enclosed version of 6800 FLEX will execute with either the SMTPC DMAF-1 or DMAF-2 controller card. When used with the DMAF-1 controller, it is only capable of single-density recording. When used with the DMAF-2 controller, it is capable of double-density, but will require a proper ROM boot routine. The ROM boot routine found in SVI's "DISKBUG" monitor for 6800 attempts to read one sector from the disk. DISKBUG was written for the DMAF-1 before the DMAF-2 ever came into existence. When used with the DMAF-2 it so happens that the DISKBUG boot attempts to read in double-density mode. On standard FLEX disks, the boot sector is always recorded in single-density. This means that the enclosed disk will not directly boot in a 6800 system with DISKBUG and a DMAF-2 controller. There are three ways to get around this problem:

- 1) Modify the DMAF-2 controller such that it always runs in single-density no matter what the software requests. This means, of course, that you will not be able to run double-density, but if double-density is not required it may be the simplest solution. This modification may be made to the DMAF-2 board on the bottom side by cutting the trace leading to pin 16 of IC29. The trace which is no longer connected to IC29 should be tied to +5 volts through a pull-up resistor. If you require a more detailed description of this modification, contact Southwest Technical Products.
- 2) If using the DISKBUG monitor, it is possible to boot up with the DMAF-2 board unmodified by replacing part of the ROM boot routine with 10 bytes of code in RAM. These 10 bytes may be placed anywhere in memory. The bytes are as follows:

C6 01 F7 90 22 C6 DE 7E E2 C7

How to boot up FLEX, simply jump to the location where the above code is stored. For example, if the 10 bytes listed were placed at \$1000, you would simply enter the command "J 1000".

- 3) A third possibility is to burn an entirely new ROM boot routine which selects single-density for reading the sector.



PP755 RELEASE

MICROPI announces BLITZ, a screen oriented text editor for the SMTP CT-92 terminal. It is available for the 6800 or 6809 and runs under TSC's FLEX. Unlike conventional editors, BLITZ has no commands to learn or remember. Each action is invoked by pushing the appropriately marked special function key. The screen becomes a window to the text file. The window can be moved up or down in the text with the SCROLL UP and SCROLL DOWN keys. The arrow keys can be used to move the cursor to the desired position within any line. Then modifications can be made by simply overtyping the old data with the new. The screen immediately reflects all changes and shows the text as it currently exists. To remove characters from a line the DELETE key is used. Each time it is pushed, the character under the cursor disappears and the rest of the line moves left to close the gap. Alternatively, to insert new text in a line the INSERT key causes the text to open up to make room for the text by moving the rest of the line right. Adding to the end of the text is as easy as typing each new line followed by a RETURN.

In general, editing with BLITZ is so intuitively simple, that it can be used immediately by virtually anyone. But it also has some more advanced features for the experienced user. BLITZ is great for programming or word processing.

BLITZ is distributed in object code for the 6800 or 6809 on 5 or 8 inch diskette. The single machine object code license is \$60. Source code is available to users wishing to enhance BLITZ for their own use for \$100.

Larry Kheriaty
MICROPI
2445 Nugent
Camm Island, Wa. 98262

Don Williams
'68' Micro Journal
P.O. Box 849
3018 Hanill Road
Hixson, Tennessee 37343
Dear Don,

I would like to inform your readers
of a company that makes excellent products

and has friendly people especially the president.

In December of 79 I started looking for a memory card I could afford. Before giving my money away, I laid out some expectations of what this memory board should do. The memory board should have: low power consumption, extended addressing, assembled if possible, static memory, and upward compatibility to the SS-50C bus using the 6809 microprocessor. All of the information below was published except for Smoke Signal at the time of this writing.

Surprisingly enough there are four companies that make a 16k (16,384 memory locations) or larger memory board. These companies are: Binix, Smoke Signal Broadcasting, Digital Research Computers, and Digital Service and Design. I will give details about each board and then make my choice. For each company I picked the largest amount of memory available on one board.

Binix sells 16K, 24K, or 32K on one board. The board comes assembled and is tested and burnt in for two weeks. Total current consumption is under two amps for a full 32K. The board can be broken down into 8K blocks and addressed on 8K boundaries. The board also has four extra address lines for extended addressing of up to one megabyte, a megabyte is one million bytes. The board is compatible with the old SS-50 bus or the newer SS-50C buss. The board also uses gold connectors for high reliability. The best features of this board are the expandability of 32K and the low power consumption for 32K (32,768 memory locations).

The Smoke Signal board at the time of this writing was not available but the information below I obtained by telephone. Also no documentation was available either. Details of the board are sketchy but the board will be sold in a 24K (24,576 memory locations) or a 32K version. Both boards will be unsocketed and tested for a maximum of six days. Both boards use the 4044 4K x 1 chip.

The Digital Research board is a 16K board that comes either in a kit or assembled form. The board uses under two amps for 16K. The board is double sided, silk screened and uses gold connectors.

This particular board does not allow for expansion above 16K. The board uses the 2114 1K x 4 chip. One of the more interesting things about the board is the regulators are at the top of the board rather than at the side or bottom as on other boards. The board is addressable on 16K boundaries only (ie. 16,24K or 32K).

The last board is a 16K board made by Digital Service and Design. This board does not come assembled or tested, but only as a bare board. The board uses the standard 2114 1K x 4 or TMS 4045 1K x 4 chip. The board can be independently addressed for two 8K blocks. Current consumption is about 3.5 amps for 16K. The average price for building this board would be about \$300. Of course the price depends on where the chips are bought. If a user compared the price of building this board with parts compared to an assembled and tested board, the user might find that the assembled board is a better buy. In addition, after the board is assembled it must be tested and burnt in to assure reliability.

So which one is the best for the requirements at the beginning of the letter? The four boards break down into two groups. The first group are Digital Research and Digital Service and Design. The boards hold a maximum of 16K and draw more current than either the Gimix or Smoke Signal board. Also the boards are upgradable to the new SS-50C bus but do not have extended addressing. Extended addressing allows the computer to address sixteen different 64K memory locations. The second group are Gimix and Smoke Signal. Both of these boards hold more than 16K, have low power consumption and extended addressing.

Gimix was my choice because of power consumption, static memory, smaller size available for purchase, expandability, and reliability. Static memory, for example removes the worry of such things as refresh, timing windows and other horrors of dynamic memory. Since Gimix does a two week burn in plus the time for testing, the return rate of the board is almost zero. Since I bought my board in January, four other boards have been purchased here in the Las Vegas area. There has not been one complaint yet from any of the four boards or the users of the boards and there probably will not be any complaints.

When I did purchase my board in January at the Consumer Electronics Show, I was skeptical that the board would work. But when I took the board home and plugged it in, the board ran fine. The next day I returned to the show and reported my results, Richard Don of Gimix was not a bit surprised. I was skeptical that the board would work because this was the first memory board I had bought assembled and tested.

Therefore before purchasing more memory for your SS-50 bus machine, consider a Gimix board as the best choice now and in the future.

TOM MATTINGLY
1005 ESSEX DR.W.
LAS VEGAS,NV. 89107

TO: Don Williams

May 26, 1980

Subject: Applevalley Software

This letter is in response to your request for information.

Applevalley Day School was founded in 1974 by my wife. It operates out of a small, old, house in a residential neighborhood in Houston, TX. I keep the books in my spare time. Several years ago, I bought a SWTPC 6800. Since no business s/w was available, I wrote my own. Over the years, it has been used, debugged, and improved. The software has been effective in processing payroll, deposits, keeping customer payment records, general ledger and checkbook balancing. I have taken our running s/w and added a comprehensive manual and offered it for sale at very reasonable rates.

The software is useful to any small service business. Although we use a 'CASH' accounting method, it should be useable for other methods. It has liberal operator prompting to lead an semi-untrained operator thru them. A tutorial is supplied, to assist and explain as the programs are run the first time against our 'dummy' data. The programs are guaranteed to run.

The small businessman who wants to program his own unique programs will find my programs a good starting point as the hard part, the interrelated file structure, has been done. And the source listings in the 86 page manual have been annotated with tips on how to fit in special needs. The programs run in FLEX 2(9) or MINI-FLEX using Basics compatible with SWTPC Disk Basic Ver 3.0 or 3.5 such as Basic 0935 For 6809 (\$59.95 from Omni-Tronics 1897 Rt33, Concord Square, Hamilton SQ, NJ, 08690)

My software is easily adapted to any system, it works well, and is supported. All prospective customers are provided a brochure with details on the programs.

Richard G. Cagle
Applevalley Day School, Inc.
11103 Sagepark Ln
Houston, TX, 77089
Phone 713-481-3586 (after 6 pm)

OS-9™ LEVEL TWO MULTIUSER OPERATING SYSTEM

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- ☐ \$495.00*

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S ingle-user, single-memory map compatible subset of Level Two for software development or stand-alone control applications.

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 - Tape or disk-based versions available.
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 - Memory management for single address-space (up to 64K).
- ☐ Disk version \$150.00*
☐ Tape version \$95.00

MOTOROLA BASIC9™ PROGRAMMING LANGUAGE SYSTEM

E xtended BASIC language compiler/interpreter with integrated text editor and debug package. Runs standard BASIC programs or minimally-modified PASCAL programs.

- Permits multiple named program modules having local variables and identifiers. Modules are reentrant, position independent and ROMable.
- Additional control statements for structured programming: IF ... THEN ... ELSE, FOR ... NEXT, REPEAT ... UNTIL, WHILE ... DO, LOOP ...

INTRODUCING

6809 SOFTWARE POWER TOOLS

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- Allows user-defined data types and complex data structures. Five built-in data types: byte, integer, 9 digit floating-point, string and boolean.
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S tandard Microsoft BASIC optimized for the 6809 and OS-9™.

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- ☐ Disk or tape \$250.00

OS-9™ TEXT EDITOR

M inimum-keystroke macro text editor useful for text preparation or interactive word processing.

- User-defined macros with parameters permit virtually unlimited command expansion. Macros can be saved, loaded

and edited.

- Buffer, line and character oriented commands.
 - Search, change and extend operations.
 - Permits multiple input/output files.
- ☐ Disk or tape \$75.00
☐ ROM set (2716) \$90.00

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Compact Motorola compatible assembler for machine language program development.

- Operates in "batch" mode or interactive line-by-line mode.
 - Facilities for generation of OS-9™ memory modules and system calls.
 - Formatted listings include syntax and context error checking.
 - Runs on OS-9™ Level One or Level Two.
- ☐ Disk or tape \$75.00
☐ ROM set (2716) \$90.00

OS-9™ INTERACTIVE DEBUGGER

F acilitates testing and debugging of machine language programs.

- Includes common "monitor" functions: memory examine/change, breakpoints, display/change registers, hexadecimal arithmetic, etc.
 - Access to system command interpreter.
 - Available on ROM, disk or cassette tape.
- ☐ Disk or tape \$35.00
☐ ROM (2716) \$50.00

BASIC 99 is a trademark of Motorola. OS-9 is a trademark of Motorola and Microware™. UNIX is a trademark of Bell Telephone Laboratories.

Most software is available on ROM, diskette and tape in versions for many popular 6809 computers. Source listings and yearly maintenance/update service are sold separately for most programs.

*Specify manufacturer and type of CPU and I/O controllers. Contact Microware® for specific availability.



MICROWARE®

Microware Systems Corporation
5835 Grand Avenue, Box 4865
Des Moines, Iowa 50304
(515) 279-8844

F&D Associates
1210 Todd Road
New Plymouth, Ohio
45654
 Send for free Catalog
 Visa ~ Master Charge ~ C.O.D.

SBM-1 SINGLE BOARD MICROCOMPUTER

The SBM-1 is a Single Board Microcomputer for the S50 bus designed to take advantage of the MC6801 which has eight distinct operating modes, expanded 6800 instruction set, serial I/O interface, 16 bit timer with 3 modes, 31 parallel I/O lines, internal clock, 128 bytes of internal RAM, etc. The board can be used on the S50 bus as a general purpose CPU or stand-alone in many control and interfacing applications.

A baud rate generator, prototyping space, and up to 8k of 2716 EPROM and/or 2716 compatible RAM make this a very versatile board. MIKBUG(tm), SWTBUG(tm), FADBUG-IIMS type Monitors in EPROM can be used to make the SBM-1 a replacement for the MP-A2. The board can be used with all 6801/6803 versions and is particularly useful with the MC6801L1 which has a built-in monitor (LILBUG tm). The 6801L1 can also be programmed to operate in any of the eight modes which allows it to be used with some other monitor residing in EPROM or RAM. Only the 6801L1 and two 14 pin chips are required to start up in minimum mode.

SBM-1 Bare Board and Doc. \$37.50 plus \$2.50 s/h

* trademark of Motorola ** trademark of SWTPC

6800/6809 PASCAL

DYNASOFT PASCAL is a cassette based PASCAL subset designed to run on most 6800/6809 systems with 12K or more of memory.

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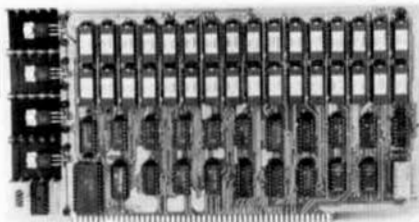
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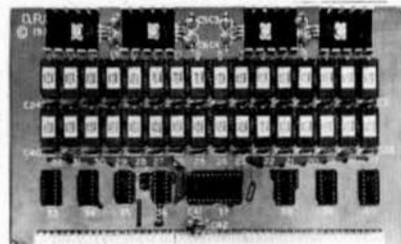
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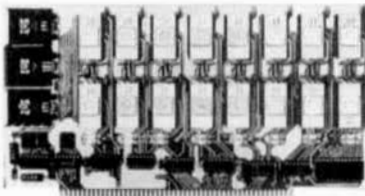
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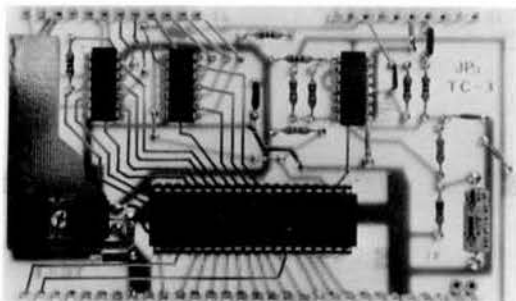
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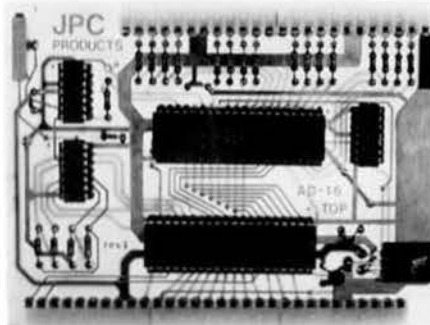
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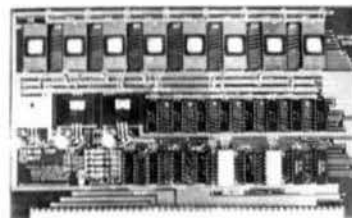
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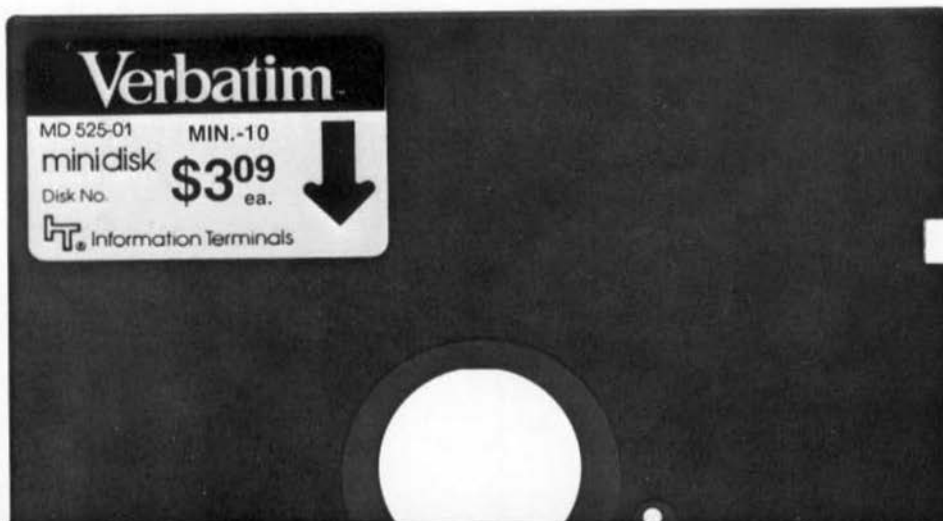


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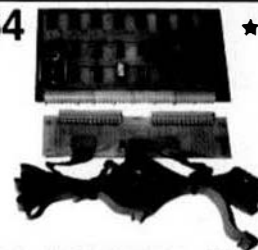
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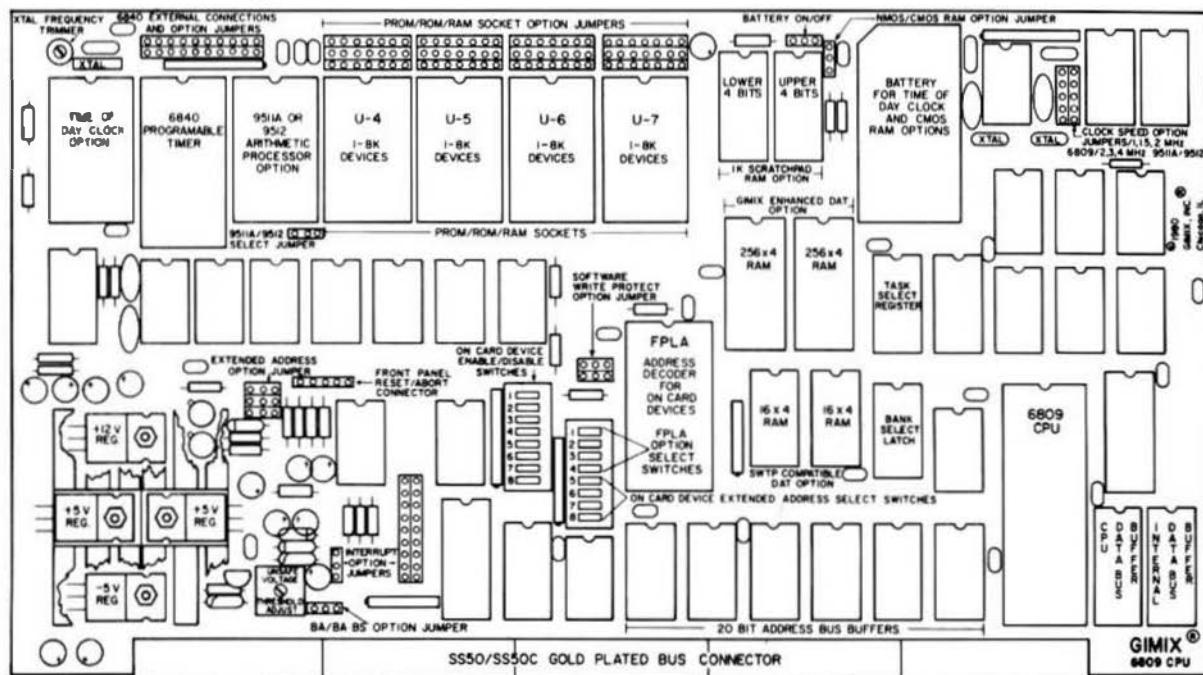
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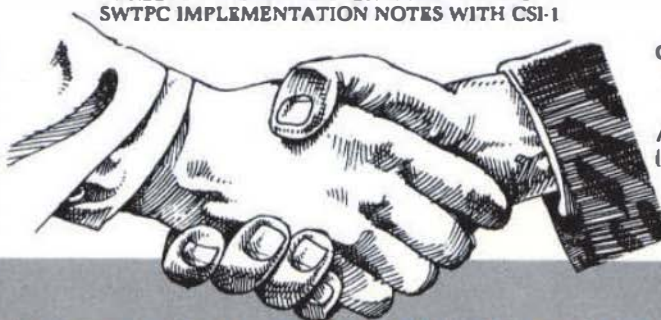
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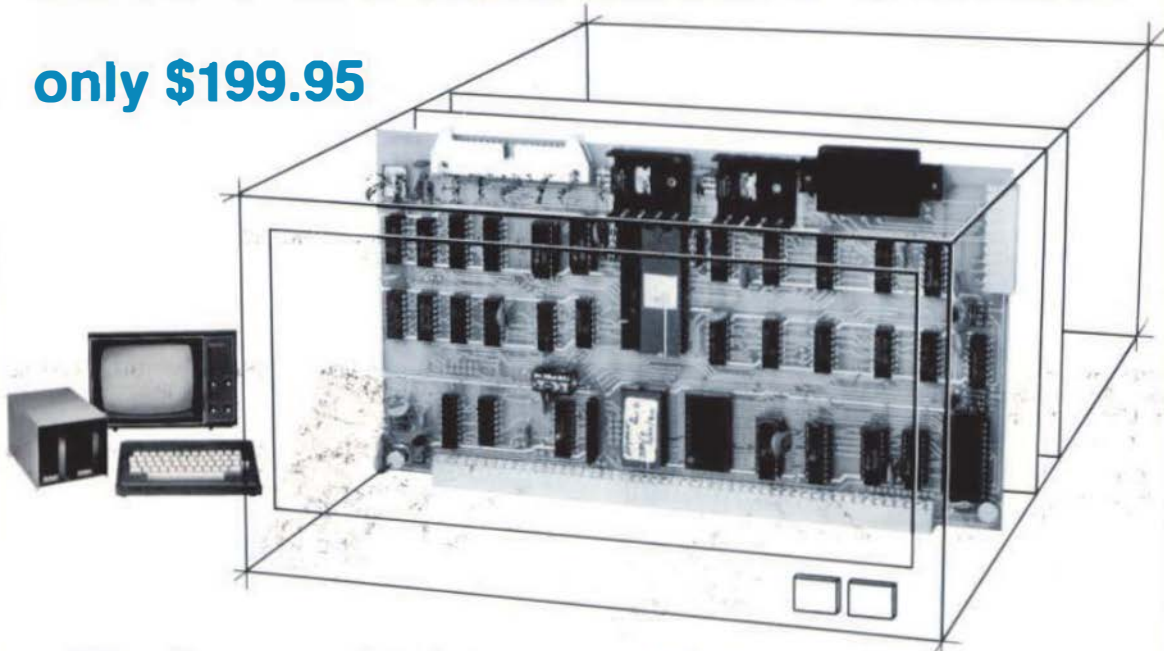
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